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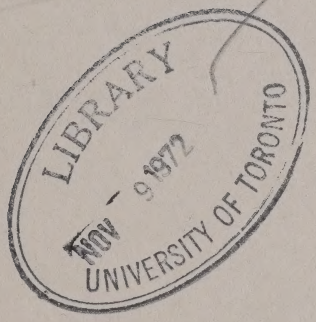

INTERNATIONAL LABOUR OFFICE

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STUDIES AND REPORTS
Series N (Statistics) No. 2

METHODS OF STATISTICS

OF

WAGES AND HOURS OF LABOUR

Report prepared for the International Conference of Labour Statisticians (29 October to 2 November 1923)

DECEMBER 1923

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PRELIMINARY NOTE

An International Conference of Labour Statisticians was held under the auspices of the International Labour Organisation at Geneva from 29 October to 2 November 1923 for the purpose of discussing the principles and methods upon which certain branches of labour statistics should be drawn up from the point of view of international comparisons.

The agenda, which was determined by the Governing Body of the International Labour Office, consisted of the following three subjects:

(*a*) The classification of industries and occupations for the purpose of labour statistics.
(*b*) The statistics of wages and hours of labour.
(*c*) The statistics of industrial accidents.

A report on each of these subjects was prepared by the Statistical Section of the International Labour Office and circulated in advance to the Governments, together with certain draft resolutions which were submitted as a basis for discussion. These reports, though prepared primarily for the Conference, are in effect self-contained and independent studies of the different subjects and many problems are treated which were not discussed at the Conference. It has therefore been decided to publish the Reports separately from the account of the proceedings of the Conference. The present report is as submitted to the Conference of Labour Statisticians, with the exception of minor modifications in statements of facts.

The draft resolutions submitted to the Conference, together with a résumé of the discussions and the definitive resolutions adopted, will be found in the General Report of the Conference [1] which is issued simultaneously with this Report.

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[1] INTERNATIONAL LABOUR OFFICE: *International Conference of Labour Statisticians*. Report on the International Conference of Representatives of Labour Statistical Departments, held at Geneva, 29 October to 2 November 1923. Studies and Reports, Series N (Statistics) No. 4. Geneva, 1923.

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CHAPTER I

The Statistics of Wages

Objects of Compilation of Statistics of Wages

The chief objects for which statistics of wages are collected result to a large extent from the nature of the wage contract. In practice wages are determined by means of individual or collective bargaining between employers and workers, having regard both to the costs of production of the employer and in relation to the cost of living of the workers. There is a level of wage above which the employer will not pay and a level below which the workers will not accept. The point between these levels which will finally be fixed depends on the relative bargaining strength of the parties to the wage contract. During the process of bargaining references are frequently made to the level of wages in other industries, districts, and countries, and to the relation between total wages and the amounts received by other agents of production.

Wage statistics are therefore collected for three main purposes, namely, to provide information regarding

(1) cost of labour as part of cost of production;

(2) the standard of living of the workers; and

(3) the distribution of the national dividend.

Statistics of wages are also collected for other purposes, for example to throw light on the amount of employment, or on the general economic progress of society of the workers. The suitability of the various types of wage data will depend largely on the object in view.

Appropriateness of Various Kinds of Wage Statistics

Wages in Relation to Cost of Production

The type of data most useful to an employer when he is determining wages is that which indicates the wage for a given unit of

work. These wage rates are the results of agreements (either individual or collective) between employers and workers. They are generally known before the work is undertaken and remain fixed, or are varied in a known manner while the agreement is in operation. They are of various kinds, but they may be grouped broadly into the two types — time, and piece rates — according as the unit is a given period or a given output. Other kinds of wage rates are generally more or less complicated variations or combinations of these types (1). With time rates of wages generally all workers on the same rates will earn the same amount during a given period. The rates may be ordinary time rates or overtime rates. In some cases minimum rates are fixed, but these cannot always be taken as representing the actual rates, as many employers may pay rates which differ considerably from the minima fixed. When such is the case information as to actual rates should be given where possible to supplement that regarding the minimum.

The term "union"(2) rates of wages is sometimes used, and these may be defined as those "either written or definitely understood and agreed to or accepted by an organisation of union men and by an employer or group of employers, under which agreement, expressed or implied, union men actually work (3)." The union rate usually fixes the minimum wage, and in various localities and trades some or nearly all workmen actually may be paid more and, on the other hand, union men may in some cases accept less than the union rate. Often, however, the union rate represents the prevailing rate for union men. Large numbers of workers, however, may not be members of the union, and may be paid at a rate which differs from the union rate. The union rate may then not be representative of wage conditions in the industry or district.

The term "standard" rates of wages (4) is also used. It is broader than the term "union" rates, and may include not only those definitely recognised both by employers and workpeople, but also, in the absence of mutual agreement, those recognised either by employers or their associations, or by the trade unions concerned. In many cases there are no rates of wages generally accepted as standard or recognised rates for workpeople in a particular

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(1) Mention may be made of various premium bonus systems of wage payment.

(2) This term is used in the United States of America.

(3) United States Department of Labour, Bureau of Labour Statistics. *Union Scale of Wages and Hours of Labour.* Bulletin 286, 15 May 1920.

(4) This term is used in the statistics of the United Kingdom, Australia, etc.

occupation or district, and the rates actually paid vary in different establishments, or even, in some cases, within the same establishment. In such cases the "predominant" rates of wages can only be accurately ascertained by general enquiries of all the employers concerned. Again, for the purpose of effecting wage adjustments from time to time, "basic" rates may be fixed, and cost of living or other bonuses or allowances added.

During recent years changes in the normal hours worked per day or per week have been so considerable that, for comparison over a period, daily or weekly wages are not sufficiently precise units of measurement, and for some purposes hourly rates may be a more satisfactory unit. There are advantages, however, in giving both hourly and daily or weekly rates, or, if only one of these is given, the number of hours in a normal day or week should be added.

Where piece-work rates operate, earnings for a given period tend to vary from worker to worker. The distinction may be made between minimum and actual rates, and similar remarks to those made above with regard to union rates and standard, predominant, and basic rates also apply.

The time and piece rate systems, though quite distinct in principle, tend in practice to approximate to a considerable extent. An employer who pays his workpeople on the time basis nevertheless has a general standard regarding what he considers adequate work for the wages paid, and a worker who fails to attain this standard will generally be discharged or put to other work. On the other hand piece wages often bear some relation to a time standard, and frequently they are determined largely in reference to a given daily or weekly wage.

Some piece-rate contracts include terms which guarantee a minimum time wage, particularly in the case of workers whose output is subject to considerable variation according as the tools and conditions of work are good or bad.

For unorganised industries and for industries and occupations where piece-work rates largely prevail, it may be sometimes preferable to collect statistics of earnings rather than of rates of wages to show wage conditions. Earnings may be defined as the amounts received, as distinct from the rates at which work is undertaken. They vary according to the length of time worked or to the output of the worker. It is evident that rates of wages as fixed by agreement may differ very considerably from earnings, information regarding which is generally obtained from the employers' pay

books. The figures thus collected are actual earnings in one or a number of pay periods, and as they may include the effects of short time or overtime they are of no value as indicating the payment for a unit of time unless information is also given as to the length of time worked. Where the number of hours actually worked in the period is, however, available, hourly earnings can be calculated. In general it may be stated that the hourly earnings of time workers differ to a very small extent only, if at all, from hourly rates of wages. A differences arises only when overtime has been worked and paid for at a higher rate than ordinary time. Where piece-work rates are paid, hourly earnings give a valuable indication as to wages on a time basis in the industry, regarding which the piece lists give little indication. If average hourly earnings are multiplied by the normal number of hours per day or per week, the result obtained is the full-time earnings per day or per week, and these may differ very considerably from actual daily or weekly earnings, if short time or overtime is being worked.

Variations in earnings per worker for the whole or part of an industry are affected not only by variations in rates of wages and in the state of employment, but also by changes in the proportions of males and females, adults and juveniles, and of skilled and unskilled workers. A rise in average earnings per worker may result from a diminution of short time, from an increase in wage rates, or from an increase in the proportion of higher-paid to lower-paid groups of workers. This last change may affect comparisons for any industry over a series of years, particularly if important changes in organisation have been made. Similarly, if earnings per worker in different industries at the same date are compared, higher figures in one industry may be due to higher wage rates, to greater prosperity (with less under-employment), or to a greater proportion of skilled as compared with unskilled workers.

The above descriptions of the various types of data apply generally to wages paid in money, and to those paid in kind, or partly in money and partly in kind. Where, however, part or all the wage is paid in kind, great difficulty arises in comparing wages in such industries or districts with those in others where the whole wage is paid in money. In agriculture, wages are particularly difficult to compare, as some workers are paid almost wholly in money, others receive a few commodities free or at a cheap rate, while still others are provided with house accommodation, a plot of land, and food as part of their wage. Even if the amount of payment in kind is stated, comparisons are still difficult, as, for example, in the

case of housing accommodation provided, great differences in quality may exist from one district to another or from one country to another. In some agricultural wage statistics estimates are given of the money value of the payment in kind. Similar difficulties arise in the coalmining industry, where free or cheap coal or free housing accommodation is sometimes provided, and in a number of other industries.

Wages in Relation to the Standard of Living of the Workers

In considering wages in relation to the standard of living of the workers it becomes necessary to draw the distinction between nominal or money wages, and real wages, or the goods and services purchasable by the money wage, and this involves the publication of statistics of prices (1).

In estimating the real wages of the workers, evidently actual earnings are more suitable than the rates of wages (2). In the case of seasonal occupations, actual annual earnings or average daily or weekly earnings based on annual data are desirable for estimating the movement of real wages over a long period. In other occupations actual daily or weekly earnings may be adequate (3). Hourly earnings are of little value for the purpose of estimating real wages unless combined with statistics of actual hours. Where overtime or unemployment, total or partial, is considerable, full-time earnings are inferior to actual earnings in enabling the standard of living of the workers to be calculated.

It may be pointed out that actual daily or weekly earnings are often much more immediately sensitive to changes in the economic conditions of the industry than are full-time daily or weekly earnings or daily or weekly rates of wages. Thus employers can generally change wage rates only after a period for negotiation. Actual earnings, on the other hand, can be diminished or increased immediately a change takes place in the prosperity of the industry, either by diminishing or increasing the time worked, or by slowing-down or speeding up the rate of production of piece workers.

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(1) See Appendix III.

(2) Account should be taken if possible of earnings in occupations subsidiary to the chief employment.

(3) In an industry such as engineering, which is little affected by seasonal conditions, earnings in a sample week may give satisfactory results. In the building industry, which is generally affected to a considerable extent by seasonal conditions, averages based on data for the whole year, or calculated from earnings in sample periods in different parts of the year, are desirable.

Wages in Relation to the Distribution of the National Dividend

In the distribution of the National Dividend among the different factors of production, wages constitute an important element. For the purpose of estimating the total wages bill of a country in order to compare the amount with the total dividend, statistics of total earnings and numbers of workers are the most valuable. Information allowing similar comparisons to be made for particular industries or undertakings is sometimes published in summaries showing total cost of production and the amounts paid in wages, salaries, interest on capital, etc.

In this connection it may be noted that statistics of actual earnings may be used to give additional information regarding changes in employment. Statistics are given showing the numbers employed and the total earnings, it being recognised that numbers alone are not adequate as giving a true indication of fluctuations in the volume of employment. Generally in such statistics no distinction is made between occupational groups, only total earnings of all workers being given.

Again, statistics showing the numbers of workers affected by increases or decreases of wage rates and the total amount of such increase or decrease are of value as indicating the effects of good or of bad trade and of general progress on wages in different trades. The methods of compiling such statistics of changes in rates of wages are described in some detail below.

Sources of Information, Collection, Classification, and Computation of Wage Data

Sources of Information and Collection

(*a*) *Statistics of Wage Rates*

The sources of wage statistics differ according to the type of statistics. Data with regard to rates of wages may be, in the case of collective agreements, obtained from either party to the contract. Amongst other sources of information as to rates of wages mention may be made of the following:

(i) Reports of local agents and correspondents, factory inspectors, etc.

(ii) The employers' pay books.
(iii) The terms of settlements, following industrial disputes, regarding wages whether by agreement, conciliation, or arbitration; and the decisions of Joint Industrial Councils and other similar bodies.
(iv) Labour exchanges.
(v) Sickness or accident insurance funds [1].

In certain countries where labour exchanges are set up records are kept as to the rates of wages offered to those workers for whom vacancies have been notified to the exchange [2]. Data from labour exchange records or from sickness or accident insurance funds may suffer from the defect that they are based on a comparatively small number of workers. They may also serve to indicate wage conditions of workers who are most frequently ill, or of industries in which liability to sickness or accidents is great.

The details required when a change in rates has been effected include the number of workers in each occupation in the locality affected, the rates before and after the change (both ordinary rates and overtime rates), and the period during which the new rate is to remain in force.

In practice it is impossible to obtain information as to the rates of wages of all workers and especially of those in unorganised industries, where often individual contracts may determine the rates of wages. This raises the question of sampling, and if fairly continuous statistics of wages are to be published, the selection of representative industries, of typical occupations within these industries, and of districts in which the industries chosen are important, becomes necessary.

(*b*) *Statistics of Earnings*

Statistics of earnings are generally obtained from the employers and are taken from the books of individual establishments [3].

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[1] Certain wage data for Norway are based on the statistics of sickness funds, while for Italy and Switzerland wage statistics based on accident insurance are published. It is not always clear in these cases whether wage rates or actual earnings are given.

[2] Thus in the *Bulletin de Documentation économique*, published by the Belgian Ministry for Foreign Affairs, wage rates data are given from time to time based on statistics supplied by the labour exchanges of Brussels, Liège, and other towns. As is indicated, however, the averages are based on too few rates to be taken as fully representative of wage rates in the occupation given.

[3] They may also be obtained from the records of accident and sickness insurance funds.

They are sometimes collected by means of personal visits of agents of the department concerned to the offices of the firms, facilities being provided for the copying of the data required. In this way detailed information may be obtained generally for a given period, such as a week or a fortnight. In other cases information is supplied by the employers filling in forms, giving the earnings of separate categories of workers or total earnings of all workers, together with the numbers of workers. In some cases the number of hours worked is also given.

As it is not practicable to make frequent wage censuses concerning all undertakings in a given industry or group of industries, the sampling method is generally adopted, representative establishments being selected in each district in which the industry is important. Further, it is not always practicable to collect the statistics continuously, and appropriate sample periods must generally be chosen.

Classification

Difficulties arise as to the definition of a "worker", and in some cases wage statistics include such groups as foremen and clerical workers who are excluded from other wage statistics. It is evidently impossible to draw a distinction between wage earners and other employees which would apply to all industries and countries, as conditions are very diverse. Consideration should, however, be given as to what groups are included and what are excluded, when making comparisons either between different industries within a country or for the same industry in different countries. As indicated in the Report on Classification (1), the most satisfactory system appears to be that of publishing the data in industrial groups with subdivisions sufficiently detailed to allow the statistics to be combined in various ways. In such subdivisions account should be taken not only of occupational groups but also of the different districts covered and differences of sex and age.

A distinction may be drawn between classification suitable for wage data which may be used for comparative purposes in relation to cost of production, and statistics of wages for estimating the real wages of the workers. In the former case, within the industrial groups, the data are most useful if given in detail by occupations, while in the latter case the broader classification into groups of

(1) See International Labour Office: *Report on Systems of Classification of Industries and Occupations.* Geneva, 1923.

skilled, semi-skilled, and unskilled workers, with subdivision according to sex and age, may be adequate (1).

Methods of Computation of Average Wages

Wage data when collected may be published in detail, but frequently averages from the details collected are calculated. These averages may then be presented in summary form according to the various systems of grouping outlined above.

The averages most frequently employed are of three kinds:

(1) *Arithmetic averages* which are used generally in connection with wage rates and may be unweighted, or weighted by the number of workers or by some other weight, *e.g.* the populations of towns, or membership of unions (2).

(2) *The mode*, or the position of greatest density, in other words the predominant wage, *i.e.* that which applies to the largest number of workers.

(3) *The median* or the centre item of a group arranged in order of magnitude (3). Also the quartiles, deciles, and percentiles may be used in summarising data.

In considering changes year by year in the wages of a large group of workpeople the arithmetic average gives no indication as to whether a change is due to an increase or decrease in the wages of the lower-paid workers, of those in the higher-paid groups, or to a general change for all groups, while the mode shows changes in the wages of the predominant group. For example, high wages paid to a small group of workers affect the arithmetic average, but not the mode. The mode is of little value, however, if the number of workers in the different wage groups show no well-defined type. The weighted arithmetic average has the advantage not possessed by the mode or median, that when multiplied by the number on which the average is based the total amount paid in wages is obtained.

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(1) Statistics of wages are sometimes classified into groups showing the numbers of workers earning given amounts, *e.g.* over 2 francs and under 2.50 francs per hour, etc.

(2) Thus the populations of towns may give suitable weights for an industry such as building, which is spread evenly throughout the country. They may be very unsatisfactory in the case of a localised industry.

(3) Dr. A. L. Bowley at the Twelfth Congress of the International Statistical Institute, Paris, July 1909, suggested the use of the median for international comparison of wages.

An advantage of the median is that, like the arithmetic average, it can generally be calculated exactly, whereas the mode may be less definite in position. It is quickly found and is not in any way affected by exceptional items. It can often be found exactly when information is incomplete. For example, if no exact information is available regarding 150,000 persons whose wages are far below the average it is very difficult to estimate their effect on the arithmetic average, but the median can be found exactly if their number only is known. It is chiefly useful when the series of wages lie fairly close together. It gives unsatisfactory results, however, if the wage groups differ considerably from one another. For example. if there are two large groups of workers, one of a thousand men with wages between 15s. and 25s. and another similar group with wages between 35s. and 45s. the median would give any position between 25s. and 35s. where as a matter of fact not a single wage earner would be found.

The arithmetic averages are those most frequently used in connection with wage statistics. With regard to wage rates, the calculation of weighted averages is often difficult, as the number of workers to whom the different rates apply is not always known, but wherever possible such averages should be given in preference to the simple arithmetic average.

Earnings data obtained from the books of the employers present less difficulty from the point of view of calculating averages, as the number of workers and the total wages paid in the period are known. By adding together data collected from various establishments either by categories of workers or for all workers, averages for these may be calculated. If the establishments are representative and cover the important centres of the industry the result may be taken to indicate wage conditions in the industry as a whole.

Comparisons of Wages

As indicated above, in making comparisons of wages the same type of data should be used and the whole wage, including all allowances and the value of payments in kind, should be taken into account. Comparisons made are usually those between the wages of similar categories of workers in different areas at the same date, or in the same area at different dates, and between the wages of different categories of workers in the same area at the same or

at different dates. Wages in any given area may be those fixed in some small locality or may be averages for a region or even for a country as a whole. Comparisons of wages of different categories of workers in the same area at the same date are the easiest to make, as the monetary unit is the same if attention is directed to nominal wages, while as regards real wages cost of living conditions are similar. Comparisons of wages in different areas are more difficult. In different districts within a country differences exist with regard to the purchasing power of money over the items entering into the cost of living, and to the habits of consumption, while in international comparisons to these differences must be added those of currency. As international comparisons present special problems they are dealt with separately in this Report, and attention is here directed to comparisons of nominal and especially of real wages within a given country.

For the purpose of simplifying the making of comparisons, the use of index numbers is very valuable, but the actual data from which the index numbers are calculated should also be given where possible. Index numbers may be used either to show the movement of wages over a series of years, or to show the relation between the wages of various groups of workers to one another at a given date.

Comparisons of Wages within a Country

(*a*) *At a given date*

The nominal wages of different categories of workers in the same district at a given date may be compared directly, as in general other conditions are equal, while real wages stand in the same relation as nominal wages. Certain differences may arise, however, on account of differences in habits of expenditure of different categories of workers. Thus the normal family budgets of unskilled labourers, of skilled artisans, and of professional workers differ considerably from one another and allowances for such differences may be necessary. In comparisons between different districts account should be taken of differences in the purchasing power of money in the different districts. These differences may be very considerable as between urban and rural districts in a big country with diverse economic conditions. In order, therefore, to compare real wages, information is necessary not only as regards the nominal wages but as to the general items of expenditure in the cost of living

and the prices of these items in the different regions compared. For satisfactory comparisons of real wages in different districts the publication of price data of the various items of consumption in each district may be necessary (1).

(*b*) *At different dates*

Attention may be directed to the actual levels at different dates or to the amount of change during given periods. For a comparison of the level of real wages of a group of workers at different dates, two series of data are necessary, namely:

(1) Series of wage statistics for different dates.
(2) Series of statistics showing the purchasing power of money at corresponding dates.

In the case of a comparison of real wages, cost of living index numbers are the most suitable for showing changes in the purchasing power of the wage over the commodities bought by the worker, but account should be taken of the fact that changes in index numbers purporting to measure the cost of living may be due not only to changes in the prices of a fixed group of commodities but also to changes in the commodities normally consumed (1). To base estimates of changes in the cost of living over a long period on a fixed budget may be to obtain results out of correspondence with actual facts. This difficulty has a special importance at the present time as normal budgets have changed very considerably in many countries during recent years owing to the exceptional circumstances of the war.

Assuming that reliable series of wage and cost of living data are available for different dates, index numbers of each may be calculated on some given date as base (= 100). Then index numbers of real wages may be calculated by dividing the index numbers of money wages by those of the cost of living and multiplying the result by 100.

It has been shown (page 11) that actual earnings per week or other suitable period give a better foundation than wage rates or full-time earnings for estimating the real condition of the workers since the latter make no allowance for short time or overtime. It

(1) See Appendix III.

may also be noted that real wages calculated from time rates of wages (*e.g.* weekly rates) show abrupt changes at the date on which new rates come into force and gradual changes varying inversely with changes in the cost of living during the period in which the rate remains in force. These changes are actually experienced by time workers fully employed, while similar results may be obtained if full-time earnings are used. On the other hand, real wages calculated from actual earnings (say weekly earnings) may not show the same abruptness of change, as they are affected not only by changes in rates but by variations in the period of employment, *i.e.* changes in short time or overtime. In many cases, however, wage rates only are available, and the attempt may be made to combine wage rate and cost of living data with a third series of statistics, namely, unemployment data, and thus obtain results more close to actual real wages of the workers. Table I (p. 20) may be used to explain a method that has been adopted (1). Column I shows index numbers of rates of wages, and column II the percentages of unemployed. Applying these latter percentages to the numbers shown in column I, and deducting the results from each corresponding index number so as to allow for relative unemployment, the figures in column III are obtained. Thus if W = full-time wage index number, I = the index number of wages allowing for unemployment, P = percentage unemployed, and P_1 = percentage employed (= 100 — P)

then

$$I = W - \frac{W\,P}{100} = W\left(1 - \frac{P}{100}\right) = \frac{W P_1}{100}$$

Column IV is the series of figures in column III recalculated on the base 1911 (= 100). In column V cost of living index numbers are shown, and in column VI and VII real wage index numbers, firstly for full-time work, and, secondly, allowing for unemployment. These are obtained by dividing the figures in column I and column IV respectively by the corresponding figures in column V and multiplying the result by 100 in each case. It should be noted that this method by making use of the percentage of unem-

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(1) This method is used by the Australian Commonwealth Bureau of Census and Statistics; see Labour and Industrial Branch Report No. 12: *Prices, Purchasing Power of Money, Wages, Trade Unions, Unemployment, and General Industrial Conditions*, 1921.

ployment (total) does not allow for short time, although a similar method would enable this factor to be taken into account if information were available as to the amount of short time.

TABLE I. INDEX NUMBER OF WAGE RATES, PERCENTAGE OF UNEMPLOYED, INDEX NUMBERS OF WAGES ALLOWING FOR UNEMPLOYMENT, COST OF LIVING INDEX NUMBERS, AND REAL WAGE INDEX NUMBERS (*a*) FOR WORKERS ON FULL TIME AND (*b*) ALLOWING FOR UNEMPLOYMENT (1).

Date	Full-time weekly wage rate index	Percentage unemployed	Weekly wage rates index numbers allowing for unemployment		Cost of living index numbers	Real wage index numbers	
			Calculated from Cols. I and II	Recalculated 1911=100		Full time	Allowing for unemployment
	I	II	III	IV	V	VI	VII
1911	100.–	4.7	95.3	100.–	100.–	100.–	100.–
1914	108.5	11.0	96.6	101.4	114.0	95.2	88.9
1917	125.2	7.4	115.9	121.6	131.8	95.0	92.3
1920	175.2	7.8	161.5	169.5	178.5	98.2	95.0
1921	184.4	9.5	166.9	175.1	169.7	108.7	103.2

(1) Based on figures from Report No. 12 : Labour and Industrial Branch of Australian Commonwealth Bureau of Census and Statistics.

A method of following the changes in rates of wages during a given period without giving the actual level of wages at different dates has been adopted in the case of Great Britain and Australia. The object of such statistics is to record the principal changes occurring in the rates of wages in the most important industries (1) and they have been used to calculate the general effect of such changes on the wage bill of the country. This information, continued over a series of years, is valuable as indicating "the effects of periods of depression and inflation of trade, and of the general progress of society on market rates of wages in different trades" (2).

A change in rates of wages is defined as follows (3): "A change in the rate of remuneration of a certain class of workpeople apart from any change in the nature of the work performed". This

(1) From these records statistics of actual rates at different dates as distinct from the amount of change during a given period may be compiled.

(2) British Board of Trade. *Report on Wages and Hours of Labour*, Part I. Changes in Rates in 1893 (C. 7567, 1894).

(3) This definition is taken from the British Board of Trade (Department of Labour Statistics): "Report on Changes in Rates of Wages and Hours of Labour in the United Kingdom in 1913" (Cd 7635), p. X.

definition excludes the following classes of changes in wages which should not be confused with the changes in rates of wages (1) :

(1) Changes due not to alterations in the rates of pay for particular classes of work, but to alterations in the proportions which the higher and lower paid classes of workpeople bear to each other.

(2) Changes in the rates of pay of individuals due to promotions or progressive increments of wages. Thus in some undertakings the rates of pay of various classes of employees are frequently regulated by scales. The rates of pay of individuals may therefore be continually altering, although the scale remains unchanged. So long as the limits of the scales for each class of workpeople remain unaltered for work of the same kind, there cannot be said to be any real changes in rates of wages.

(3) Purely "seasonal" changes in wages which occur regularly in certain periods of the year in some trades, and which are not regarded as involving alteration in the recognised terms of employment.

(4) Changes in the terms of employment which merely provide compensation for extra work. Thus a reduction in piece rates in consideration of the introduction of improved machinery would not be regarded as a change in wage rates. If the result of such a change is to leave earnings as before, then there has been no real reduction but merely a re-adjustment of piece prices corresponding to a change in the conditions of work.

Methods of Calculating the Effects of a Change in the Rate of Wages

For the purpose of calculating the effect of a change in the weekly rate of wages as between one date and another, it may be assumed that the number of persons employed at the two dates remains constant, and that they are employed the usual number of hours recognised as constituting a full ordinary week's work in

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(1) The classes of changes excluded are given in the Report mentioned in footnote 3. The text summarises information given on pp. X and XI of that Report.

the particular industry and district(1). Where time rates of wages prevail and recognised hours are fully known, the effect of a change on a full week's wages is easily calculated by multiplying the amount of change per worker by the number of workers to whom the change applies. In the case of elaborate piece work scales of wages, it is often impossible to make even a rough estimate of the total effect on wages of a given modification of the list. Employers are frequently able, however, to state the effect of a given change as an increase or decrease of so much per cent. on the previous wages. If, then, the actual earnings in a full week in the occupation, based on a special survey at any date, are known, the money equivalent of percentage changes may be calculated on this basis. If, for example, there are 1,000 workers in a given branch of the textile trade, and in 1920 average earnings for a full week's work were 40s., then a 5 per cent. change would involve a change in money wages of 2s. per worker per week or an aggregate change of 2,000s. or £100 per week. This method assumes that changes in piece rates result in proportionate changes in earnings, but this is not generally the case, as, if piece rates go down, workers frequently work harder to minimise the possible loss of earnings.

The results of changes in the principal industries may be tabulated monthly or annually by industries in order to show

(1) number of workpeople affected by increases;
(2) amount of increases in weekly wages;
(3) number of workpeople affected by decreases;
(4) amount of decreases in weekly wages.

If in a given year the rates of wages of a given group of workers are changed more than once, the numbers affected are only counted once, though the total or net amount of all changes is recorded.

The tabulation adopted by the British Ministry of Labour for summarising changes in rates of wages may be studied from table II, which shows the number of workpeople in Great Britain and Northern Ireland affected by changes in rates of wages reported to the Department during the first nine months of 1922.

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(1) These assumptions are made in the case of the British Ministry of Labour statistics of changes in rates of wages.

TABLE II. NUMBER OF WORKPEOPLE IN GREAT BRITAIN AND NORTHERN IRELAND AFFECTED BY CHANGES IN RATES OF WAGES DURING THE FIRST NINE MONTHS OF 1922 [1]

Group of trades	Approximate number of workpeople affected by		Net amount of change in weekly wages	
	Increases	Decreases	Increases	Decreases
			£	£
Building	100	509,000	15	384,300
Mining and quarrying	72,000	1,034,000	11,125	583,000
Iron and steel	100	238,000	100	226,900
Engineering and shipbuilding	—	1,308,000	—	1,115,800
Other metal	—	365,000	—	180,100
Textile	800	974,000	115	344,300
Clothing	—	696,000	—	153,300
Transport	100	990,000	15	444,200
Paper, printing, etc.	—	187,000	—	43,700
Furniture and woodworking	—	91,000	—	45,400
Chemical, glass, brick, pottery	—	273,000	—	114,000
Food, drink, and tobacco	50	278,000	5	70,500
Public utility services	50	348,000	10	157,400
Other	50	162,000	15	45,600
Total	73,250	7,453,000	11,400	3,908,500

[1] *Labour Gazette*, October 1922.

International Comparison of Wages

Various methods have been adopted of making international comparisons of wages at a given date, and the method to be used depends to a large extent on the general economic conditions at the time the comparison is made. The chief methods are described below.

(*a*) Various representative categories of workers common to the countries for which the comparison is to be made are selected (*e. g.* skilled metal workers or bricklayers). The money wages paid in the currencies of the different countries for a given period of work (*e. g.* a week) may then be converted at the ruling rates of exchange into a common currency (*e. g.* American dollars or Swiss francs) and the levels of wages compared. Such a method would be sound on the assumption that a unit of the currency into which the wages were converted would purchase, in each of the

countries concerned, the same quantity of commodities. When, however, there are differences between the purchasing power of a unit of currency in different countries, then the method described, while having a certain value in giving the relation from the point of view of international competition of the wages paid in different countries, subject to allowances being made for differences in the efficiency of the workers in these countries, is an entirely false method of comparison of the level of wages within the countries. It should be noted that it is in terms of the internal purchasing power of the currency of a country that wages are paid, and this applies both to the worker in relation to his standard of living and to the employer as part of his costs of production.

It is necessary therefore in order to make reliable comparisons of the wages paid in various countries to use, in times when the purchasing power of a given unit differs in different countries, methods other than the one described above.

(*b*) The internal level of wages can be measured adequately — in relation to internal prices only. Hence international comparisons may be made by establishing the relation between the wages of similar categories of workers, and the prices of commodities in each country at the date of the comparison. For some purposes wholesale prices may be taken, while for others retail prices or the prices of items entering into the cost of living are preferable, as, for example, in comparing the well-being of the workers in different countries. In comparing levels of real wages of the workers, in addition to obtaining wage data, it is necessary to collect statistics of the cost of living in each of the countries, and with regard to the latter, a special difficulty arises. In addition to the difficulties of compiling a typical working class budget for a given country there is the additional difficulty that the items constituting the typical budget of one country may differ considerably from those in another, without implying any difference in the standards of living. It is evidently unsatisfactory to take the typical budget of one country only as standard and collect in other countries price data for the items included. On the other hand it is very difficult if different budgets are taken for different countries to be certain that these represent equivalent standards of living. The reliability of the results of international comparisons of real wages is undermined by the practical impossibility of solving these problems.

Where comparisons are made between countries in which the disparities in the items entering into the normal consumption of a

working class family are relatively small, reasonably reliable results may be obtained by selecting items of consumption common to all the countries, and collecting price data for these items.

The wage and price data may be converted at the ruling rates of exchange into a common currency and comparisons made for each group separately. It may be found, for example, that the relation of money wages in Great Britain and Germany are in the proportion of 100 : 80, while the relation of prices is 100 : 120. Then the ratio of real wages in Germany to those in Great Britain is

$$\frac{80 \times 100}{120} : 100 = 66.6 : 100 .$$

(c) A somewhat similar method, which has the advantage of avoiding rates of exchange, may be described (1). It involves, however, a knowledge of the prices of the articles constituting typical budgets in various countries, and, as such information is difficult to determine satisfactorily, in practice the prices of those articles of common consumption in the various countries may be taken. The method is to calculate the number of hours which it is necessary to work in various occupations in order to earn the money required to purchase a given group of commodities.

If, for example, the group of goods and services selected costs in Great Britain 30s. and in Germany 1,500 marks in August 1922, while the wage for an hour of labour in a given occupation is 18d. in Great Britain and 40 marks in Germany, then a worker in Great Britain must work 20 hours and a worker in Germany 37.5 hours to earn the money necessary to purchase the quantity of goods and services selected. The reciprocals of these numbers for Great Britain and Germany stand to one another in the ratio of 100 : 53,3, this relation representing the proportion between the real wages in the two countries, of the group of workers considered.

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(1) This method and the succeeding one were described and used by Mr. John Hilton, Director of Statistics, British Ministry of Labour, in an article on "Comparative Real Wages in Great Britain, France, Germany, Belgium, and the United States of America". (*Manchester Guardian Commercial : Reconstruction in Europe Series*, No. 9, October 1922.)

It is also used with slight modifications in the calculation of index numbers to show comparative real wages in London and certain capital cities abroad, at various dates in 1923, these index numbers being given in the *British Ministry of Labour Gazette*, July 1923 and following months.

(*d*) In periods when actual details of price data are not available a fourth method of effecting international comparisons of real wages has been adopted. The data necessary for this method are:

(i) Wage statistics;
(ii) Cost of living (or wholesale price) index numbers for each country, based on the same date;
(iii) The relation of the internal purchasing power of the various currencies at the date on which the price index numbers were based;
(iv) Rates of exchange at the date taken as basis for price index-numbers.

The method, which will be described in detail below, is of special value at the present time as it enables comparison to be made without the disturbing effects of violently fluctuating rates of exchange.

The method may best be described by taking a concrete example, comparing say the wage of unskilled metal workers in Great Britain and Germany in August 1922, on the basis of the following data:

	Great Britain	*Germany*
Hourly wage rates	13.1 pence	37.7 marks
Cost of living index numbers (1914=100)	179	7765
Ratio of internal purchasing power before the war (1)	100	114.3
Gold parity of exchange	£ 1	20.43 marks

Using these data, it is evident that 37.7 marks in August 1922 had the same purchasing power (2) as $\frac{37.7 \times 100 \text{ marks,}}{7,765}$ *i.e.* 0.4855 marks in 1914.

Converting this sum into English money at the parity of exchange the wage represented 5.7d. Allowing now for the fact that before the war the cost of living in Germany was 14.3 per cent. higher than in Great Britain, the equivalent in Great Britain in 1914 of 5.7d. in Germany would be $\frac{100 \times 5.7\text{d.}}{114.3} = 4.97\text{d.}$

Lastly, in order to determine the sum necessary to purchase

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(1) These figures are based on investigations by the British Board of Trade (Labour Department) in 1907, and continued to 1913 by the South African Government (see Report of the Economic Commission).

(2) But note that the German cost of living index numbers are based on a post-war consumption budget considerably inferior to that in 1914.

in August 1922 the goods and services, which in Great Britain in 1914 cost 4.97d. it is necessary to multiply that sum by $\frac{179}{100}$, the result being 8.9d.

The ratio, therefore, of real wages of unskilled metal workers in Great Britain and Germany in August 1922 was 13.1: 8.9 = 100: 68 (1).

(*e*) International comparisons of changes in wages during a given period may be made by calculating on a common base index numbers of wages of given groups of workers in different countries. Comparisons of changes in nominal wages are of little value, while in practice those of changes in real wages are rendered especially difficult by lack of uniformity in the cost of living data available. Some countries calculate index numbers on a pre-war consumption budget, while others base their figures on post-war items of expenditure. If, for example, comparison is being made between changes in the real wages of a given group of workers in Great Britain and in Germany during the periods 1914 to 1923, accurate results on the basis of existing data are almost impossible to obtain. Thus the cost of living index numbers for Great Britain are based on a pre-war standard family budget. Those for Germany are calculated on the basis of a post-war budget estimated partly on theoretical considerations, and which differs very considerably from pre-war consumption, although the cost of living index numbers make no allowance for this difference in standard. Consequently conclusions based on such index numbers as to changes in real wages cannot reasonably be compared with those based on cost of living data in a country where the standard has remained unchanged.

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(1) It should be noted that in this conclusion no account is taken of differences in efficiency of the workers. Further, there was a reduction of the British wage on 28 August of 1.4 d. per hour, and a further similar reduction on 25 September in consequence of which, and assuming the German wage stood in the same relation to the cost of living at the end of September as in August, and that the cost of living in Great Britain had remained unchanged, the ratio would have been 100 : 86.

CHAPTER II

The Statistics of Hours of Labour

Objects of Compiling Statistics of Hours of Labour

The objects for which statistics of hours of labour are compiled are in some respects similar to those described in connection with wage statistics, and arise out of the nature of the labour contract. The employer is interested in the number of hours which his workpeople may be employed in relation to the wage which he pays or in relation to output, while the worker is interested in the length of his working hours as an element in his standard of life. Statistics of actual hours may also be of value as giving information with regard to the state of employment.

The main objects are therefore to give information as to duration of labour in relation to:

(1) production,
(2) conditions of labour,
(3) employment.

Statistics of Hours of Labour

Statistics of Hours in Relation to Production

In relation to production, the number of hours which may be worked in a full ordinary day, week, or other period, are of chief importance and statistics of actual hours may be of much less interest. As with rates of wages, full-time ordinary hours are generally fixed before the work is undertaken. They may be determined by individual or collective agreement between employers and workers, or be established by law, departmental order, or other recognised authority. Most frequently the hours fixed are regarded as maximum ordinary hours, but usually provisions are

made whereby overtime hours may be worked, for which, however, higher rates of pay are in most cases fixed.

With regard to ordinary full-time hours, they may be union, standard, or predominant, these terms being used with similar meanings to those described in Chapter I of this Report (Statistics of Wages).

The period taken as the most satisfactory basis for statistics of hours may vary for different groups of workers, but in general the most suitable period is that of a week (1). Thus, if the number of hours per day are given, it is not clear in occupations where a short day is worked on Saturday or on some other day, what number of hours constitute a full ordinary week. In certain industries, for example building and agriculture, differences exist between the ordinary hours in summer and those in winter. In such cases information should be given as to the ordinary hours, for example per week, in each season, together with the number of months to which each figure applies.

In certain occupations the day or the shift is the most suitable period. Thus for coalmine workers the shift is generally used, but as different methods are adopted of fixing the length of a shift, supplementary information is required. In some countries the shift begins from the time the first man of a group descends, and ends when the last man reaches the surface. In others it is reckoned from the time the first man leaves the surface, and ends when he reaches it again, while other variations are in force. Again, various practices exist in coalmining, agriculture, and other occupations with regard to meal times, and unless information is given as to the conditions in force, comparisons for different groups of workers are vitiated.

Statistics of Hours in Relation to Conditions of Labour

In considering the length of the working day or week as an element in the conditions of labour, attention is naturally directed first to ordinary full-time hours. Statistics of actual hours, which include the effects of periods of overtime or short time, are of interest from the point of view of conditions of labour, largely in relation to statistics of actual earnings and of employment. Thus a period of short time when actual hours are less than ordinary

(1) Supplementary information as to the number of hours in an ordinary working day is in some cases of value.

hours is harmful only in so far as it implies a reduction resulting from lower earnings, in the standard of living of the workers, or because of the directly injurious effects of periods of enforced idleness. It may even be beneficial if the ordinary hours are too long. On the other hand periods of overtime with higher rates of pay may be of value in raising the standard of living of the workers, although this advantage may be more than counterbalanced by the loss of leisure time (1).

Statistics of Hours in Relation to Employment

Statistics of ordinary hours as fixed by agreement or in other ways are evidently practically valueless as giving information regarding the state of employment. Information as to actual hours may indicate, however, for the workers covered, the amount of short time or overtime worked. Statistics of this kind are sometimes given in other units than hours. Thus some mining statistics give the number of shifts worked or number of days of "presence" during a given period, such as a month or a quarter, and these may be compared with the number of shifts possible if full ordinary time had been worked, while, as the number of hours in the shift or day of presence is known, the figures can readily be converted into hours.

Sources of Information, Collection, and Computation of Data of Hours of Labour

Sources

(*a*) *Ordinary or Normal Hours of Labour.*

The chief items regarding which information is required are number of hours and number of workers. In the case of ordinary hours of labour, the figures may be obtained from sources similar to those of rates of wages, for example from collective agreements or from enquiries at different establishments. It is evident that ordinary hours of labour are much more uniform than rates of wages, and in many cases a certain number of hours per day or week applies to all workers in an establishment, in all establish-

(1) From the point of view of the conditions of the workers, account should be taken of hours worked in occupations subsidiary to the chief employment. Information of this kind is, however, very difficult to obtain.

ments in a given industry and district, or even in all districts, whereas there may be many variations in the rates of wages of different grades of workers. Details as to the normal number of hours worked are not difficult to obtain (1), but to collect information as to the number of workers to whom these hours apply is somewhat more difficult.

(*b*) *Actual Hours of Labour*

As with statistics of actual earnings, data of actual hours are generally obtained from the employers and are taken from the books of the individual establishments. Generally it is necessary to adopt the sampling method both as regards the establishment from which information is obtained and for the period covered by the statistics. Where no continuous record is kept of the actual hours worked by individual workpeople, a special record may be kept during the period covered.

Collection

Similar methods of collection of data are employed as in the case of wage statistics. With regard to frequency of collection and publication, ordinary hours of labour generally vary to a small extent only over considerable periods, so that comprehensive compilations often retain their validity very largely for long periods. Probably an annual publication giving statistics of hours, together with the monthly publication of information regarding changes during the period between one annual compilation and the succeeding one would be adequate.

Actual hours are subject to more frequent change in many industries than ordinary hours owing to the introduction of short time or overtime to meet variations in industrial prosperity. Where such changes are important, continuous series of statistics or data published at frequent intervals are desirable.

Computation

The methods and problems connected with the calculations of averages from the details collected are similar to those discussed in Chapter I of this Report (Statistics of Wages), and need not be repeated here. As regards comparisons of statistics of the

(1) Except in the case of occupations where the workers are unorganised and where the work is done in small establishments or is of a domestic character.

hours of labour of different groups of workers in different districts or countries at the same or different dates, these can be made directly on the basis of the common unit of measure, and all the difficulties considered in connection with wage comparisons which resulted from changes or differences in the unit of measure disappear in the case of statistics of hours. One great difficulty remains, namely that due to differences in the intensity of labour in different occupations, which appear to indicate that an hour of labour is in some ways an unsatisfactory unit of measure, but a solution of this problem lies outside the scope of this Report.

APPENDIX I

Description of Wage Statistics published in Various Countries

Remarks

In the sections which follow, information is given as to important statistics of wages published for various countries. The review is not intended to be complete and attention is specially directed to those statistics which are published within a comparatively short period of the date to which the latest figures applied. It may be stated that the statistical yearbooks of most countries give certain data as to wages and hours of labour, but these are in any cases summaries of statistics already published. The departments of agriculture in many countries compile statistics of wages of agricultural workers. Also a number of countries publish wage statistics compiled from information contained in the reports of factory inspectors, or other wage data obtained incidentally. References to such statistics are not generally made in the following notes, nor to general "Wage Censuses" which are dealt with in Appendix II.

For the statistics described, indications are given as to the publication in which they are found, the nature of the data, industries covered, methods of collection, and of the calculation of averages.

The countries are arranged in alphabetical order as determined by the French names.

SOUTH AFRICA

Statistics of standard or average rates of wages of European adult male workers in various occupations in the metal, building, and printing industries are published in the *Monthly Bulletin of Union Statistics* of the Office of Census and Statistics. The figures, which are now generally given for the end of each quarter, are shown separately for nine important centres in the Union. Data are also given for different categories of European male workers in the Witwatersrand gold and coal mines. Averages for the Union as a whole of the nominal and effective weekly wages of European adult male workers, calculated as described below, are given for the mining, metal, building, and printing

industries, for the police force, and for clerical workers in public service. Indexes of industrial activity (employees and wages) in manufacturing establishments in certain industrial areas, based on data supplied by the employers, are also published.

Statistics of wages are compiled by the Office of Census and Statistics, and published each year in *Social Statistics*. The data include the standard or average wage rates of European adult male workers in ten industrial groups, namely, the mining, engineering and metal, building, printing, general manufacturing, transport and communication, trading, clerical, domestic, and miscellaneous groups. The figures are obtained for each of the nine principal industrial centres of the Union, the information being mainly from trade union sources, and from the employers. Averages are calculated for each industrial group, and for each town. In calculating these averages weights are applied only in the final results. Thus in calculating the weighted average wage for all industrial groups combined in each town and in the Union as a whole, the arithmetic average of the various rates in different occupations in each industry in each town is weighted by a number representing the number of persons in that industry in the town concerned.

In addition to giving detailed information and average nominal wages, average effective (real) wages are given by industrial groups for the chief areas and for the union as a whole. Two series of effective wages are given, one calculated from nominal wages by using index numbers based on food, fuel, light and rent, and the other similarly calculated by using the more complete cost of living index number inclusive of clothing, hardware, and other items. The statistics of nominal wages are available for various years from 1895, and effective wages from the year 1910.

Unweighted average weekly wages paid to European adult female workers are published (*a*) for all industrial groups combined (1), figures being given separately for each of nine important towns, and (*b*) for all nine towns combined, figures being given separately by industrial groups. The methods of collection and calculation are similar to those described above for male workers. No calculation of effective (real) wages has, however, been made.

The minimum rates of pay fixed by Wages Boards for women and young persons in various occupations in the chief industrial areas are also given, the data being obtained from the Labour Department.

Average weekly rates of wages paid to coloured native male unskilled workers in certain industrial areas in the Union are given by industries.

An attempt is made to institute a definite comparison between wages paid in the United Kindgom, Canada, Australia, and New Zealand (during the period 1910-1921) (2). For this purpose the building trade has been chosen for the following reasons: (1) the average wages paid

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(1) The industrial groups are the same as those given for male workers except that the mining, metal, and building groups are not included.

(2) See *Social Statistics*, No. 4, 1922.

in this trade in South Africa approximate very closely to the general average of all trades, and apparently are almost equally typical of the average in other countries; (2) better and more directly comparable statistics are available for this trade.

The arithmetic average of the wages paid to bricklayers, masons, carpenters and joiners, plumbers, plasterers and painters, in the principal towns in each of the different countries has been computed. Labourers have been omitted in all cases on account of the difficulty of comparing South African native labour with the white labour of other countries. A further comparison is made of the purchasing power of a sovereign in the various countries (during the period 1910 to 1921). By means of these two sets of comparisons, *i.e.* of wage rates and the purchasing power of a sovereign at different dates, an international comparison of real wages is made.

Information as to hours of labour is included in *Social Statistics.*

GERMANY

1. *Wirtschaft und Statistik*

Statistics of rates of wages as fixed by collective agreement in a number of important industries and districts are published in *Wirtschaft und Statistik.* Figures are given for the metal, building, woodworking, printing, textile, and chemical industries, and for State servants, both manual workers and officials. In addition, statistics generally of earnings are given for coalmine workers in the Ruhr and other basins. In most cases separate data are given for a number of large towns or important centres, while weighted averages based on the rates in these centres are calculated. In addition to weighted averages for the different industries, a combined weighted average of the wage rates of workers in the building, wood, metal, textile, chemical, and printing industries, and of workers in State employment has been computed. Detailed information is not available as to the nature of the weights used. The figures given are generally average rates of wages for the week or month, and the series are continuous in most cases from April 1922, while index numbers based on the wage rates in 1913 or 1914 are included. In some industries the wage rates are given of workers in typical occupations (*e.g.* bricklayers and carpenters, hand compositors), while in others they are grouped as skilled, semi-skilled, and unskilled. In the textile industry a distinction is drawn between the wage rates of men and of women in typical occupations. In industries where allowances are paid in respect of wife and children, data are given separately for unmarried workers, and for married workers with two children.

2. *Reichsarbeitsblatt*

The wage data published in the *Reichsarbeitsblatt* are of two kinds:

(*a*) *Wage Rates as fixed by Collective Agreements.* In each issue are given for various industries and districts summaries of collective agree-

ments fixing the rates of wages for different categories of workers. The duration of the agreement is generally stated, while rates for various periods such as hourly, daily, or weekly rates are given. In certain cases an indication is given as to the number of the *Reichsarbeitsblatt* in which the rates fixed by the preceding agreement were published, and it is thus possible to make comparisons of the rates of wages at different dates. The very large number of changes in agreements during recent years and the shortness of the periods covered by new agreements makes it practically impossible to publish the wage rates fixed by all contracts. The figures given are, however, of value as indicating wage rates of various groups of workers at given dates or in some cases at different dates. No attempt is made to give average rates for a number of occupations or districts, the figures being merely reproduced from the actual agreements. In addition to wage rates, information is given as to hours of labour, holidays, etc.

The summaries of the various collective agreements are classified by industries, of which the following are the most important: agriculture, gardening, forestry and fishing; mining and quarrying; earth and stone; metal working and engineering; chemicals; textiles; paper; leather and rubber; woodworking; food and drink; clothing; laundry; building; commerce; transport; hotels, etc.; theatres; miscellaneous.

(*b*) *Earnings of Miners.* From 1887 onwards statistics of average earnings in the mining industry in Prussia have been published regularly for each quarter, the figures being given for the chief mining areas, while more recently similar figures have been published for Bavaria, Saxony Free State, and Saxony-Altenburg. Quarterly and yearly averages are given. The statistics are published also in the *Deutscher Reichsanzeiger*, and the yearly averages summarised in the *Statistisches Jahrbuch.* In addition to the data for coalmining (hard coal and lignite), figures are given for salt mining and ore mining (including copper). The statistics are obtained from mining records including the pay-books. The tables give number of workers (*a*) total and (*b*) those in subsidiary occupations. The numbers are averages calculated by dividing the total numbers of ordinary "worker shifts" per month by the number of working days (*i.e.* calendar days in the month, less Sundays and holidays). The quarterly averages are based on the monthly figures. The number of workers does not include officials, whether of the management, the technical or the commercial staffs. The total number of shifts is given and also the average shifts per worker and the average number of overtime shifts. The earnings are divided into two groups, the first of which *(Leistungslohn)* does not include payment for overtime and allowances for house and children, which are included in the second *(Barverdienst).* For each group data are given by districts for all workers together, of total earnings, earnings per worker per shift, and average earnings per worker per quarter. In addition to these figures, separate figures are given of the average shift earnings of different groups of workers such as hewers and drawers, other underground workers, adult male surface workers, youths under 16 years, and women. In all cases the wage per worker per shift is calculated by dividing the total earnings of the group by the total number of "worker shifts".

AUSTRALIA

Statistics of rates of wages and hours of labour are published regularly by the Commonwealth Bureau of Census and Statistics in the *Quarterly Summary of Australian Statistics*. They are also published each year in the *Labour Bulletin* (1).

Figures are given, showing

(1) Changes in rates of wage during given periods.

(2) Average hourly and weekly rates of wage at given dates.

The data of changes in rates of wages are compiled on the lines described in the above report, and show by States and for the Commonwealth as a whole the number of (*a*) increases, (*b*) decreases; the number of workpeople affected (*a*) by increases, (*b*) by decreases; the total amount of (*a*) increase, (*b*) decrease, per week; the total result of all changes and the average amount of increase or decrease per head per week. The figures are compiled quarterly, while annual summaries are given. For the Commonwealth as a whole figures are also given by industrial groups.

The figures of average rates of wage at the end of each quarter are compiled separately for (*a*) adult male workers, and (*b*) adult female workers, data being given for a number of industrial groups (2) and also for a combination of all groups. The particulars are obtained primarily from awards, determinations, and industrial agreements under the Commonwealth and State Acts, and are generally minimum rates. In cases where no such rate is in force the ruling union or predominant rate of wage being paid is ascertained from employers and secretaries of trade unions. The enquiries are limited generally to industries in the metropolitan area of the capital town in each State (3). From 30 April 1914, which is taken as base, the number of occupations included in comparative computations has been kept constant (3,948 male and 308 female occupations). Arithmetic averages are calculated of the various rates of wages in a given industrial group in each state, there being no satisfactory data as to the number of persons engaged in each of the occupations for which rates of wage are obtained, and therefore no detailed system of weights could be applied. For the calculation of the average wage for all industries together in each State, and for each industrial group throughout the States, however, a careful system of weighting is adopted. For example, in calculating the average wage for any year, the average wage in each industrial group is multiplied by a

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(1) " Prices, Purchasing Power of Money, Wages, Trade Unions, Unemployment and General Industrial Conditions ", compiled by the Labour and Industrial Branch of the Bureau of Census and Statistics.

(2) The groups are wood and furniture, engineering and metal works, food and drink, clothing and boots, books and printing, other manufacturing, building, mining, rail, and tram services, other land transport, shipping, pastoral and agricultural, domestic and hotels, and miscellaneous.

(3) In order to make the enquiry a comprehensive one, it is necessary to include certain industries which obviously are not carried on in the capital towns (for example, mining, shipping, agricultural, and pastoral work).

weight representing the relative number of all male workers engaged in that group of industries in the particular State. The sum of the products thus obtained, divided by the sum of the weights, represents the relative aggregate average wage for that State for the particular year. The number of working hours which constitute a full week's work in each occupation is averaged and weighted in a similar manner to the rates of wages. This course is adopted in order to overcome the difficulty of making comparisons of the rates of wage in any specified occupation, owing in many instances to a different number of working hours constituting a full week's work in separate States. By dividing the weighted average of working hours into the weighted average weekly rate of wage, a standard of comparison is obtained which for some purposes may be considered more adequate. For the purpose of comparison as between States, it should be observed that the lists of occupations to which the rates of wage refer are not by any means uniform, neither do they necessarily include all industries carried on in each State.

In addition to the statistics of nominal wages described above, calculations are made of real ("effective") wages, and the results published each year in the *Labour Bulletin*. The methods of calculation are similar to those described in the text of this Report, results being given (*a*) for full-time work and (*b*) allowing for unemployment. The cost of living data used in the calculation of the real wages is based on food and rent only.

Detailed statistics of minimum rates of wages in the chief occupations in the capital town of each State are also published. The data given are the rates fixed in the latest awards or determinations under Arbitration and Wage Board Acts, together with those fixed in industrial agreements, and ruling or predominant rates. The rates of male and of female workers are tabulated separately.

In addition to the wage data described above, and which is for the Commonwealth as a whole, certain states publish statistics of rates of wages. Thus information as to the wage rates of workers in various occupations is published in the *Quarterly Statistical Bulletin* of the State of New South Wales.

AUSTRIA

For important occupations in Vienna, rates of wages as fixed by collective agreements have been published in the *Mitteilungen des Bundesamtes für Statistik*. These wage statistics were first published in *Mitteilungen No. 2* for 1921, which gave pre-war minimum weekly rates in comparison with those paid at the end of 1919 and at the end of 1920 or the beginning of 1921. It was pointed out that these minimum rates did not give satisfactory indications as to the actual wages of the different categories of workers. In more recent tables in addition to minimum rates per hour, day or week, average rates and the highest rates paid have been given, figures being published generally for the end of each quarter to December 1922. These statistics as well as those described below are as supplied by the Vienna *Arbeiterkammer*, and are based on trade union data.

From April 1923 a new and larger publication, *Statistische Nachrichten*, has been compiled by the Statistical Office, and wage data are given for an increased number of occupations, figures being tabulated for the end of each month from December 1922. The figures given are described as the predominant wages for a 48-hour week for the various categories of workers, and no allowance is made for short time or overtime. They vary somewhat in type, however, from industry to industry. Thus in certain occupations, for example those in the building industry, the wage rates fixed by collective agreements are regarded as typical, and actual wages differ from them in a small degree only. In other occupations, especially where piece rates play a great part, the wage rate fixed by collective agreement is only a minimum wage for the purpose of guaranteeing to the worker a minimum of existence, and actual wages are in most cases higher. For these occupations figures are given which, according to information supplied by the Trade Unions on the basis of wages in the different undertakings, are to be regarded as typical wages representative of the earnings of most workers.

Naturally in practice considerable differences exist in the wages paid in different undertakings, some being higher and others lower than those given, but the figures should not be regarded as arithmetic averages of the maximum and minimum wages paid. For some piece-work occupations the wages fixed by collective agreements are given for comparison with the predominant wages.

Among the industries for which figures are given are the building, clothing, chemical, paper, rubber, glass, printing, wood, leather, commerce and transport, food, metal, and textile industries.

No attempt is made to combine the data into a general average.

BELGIUM

Statistics of wage rates, time and piece, are published for a number of industries and occupations in different districts in Belgium in the *Bulletin de Documentation économique*, compiled by the Ministry for Foreign Affairs (Section of Commercial Policy and Economic Studies), and also every six months on the *Situation économique de la Belgique*, in which the survey covers a wide field. Comparisons are made in a number of cases with pre-war wages.

Some of the figures given are averages for various towns and groups of workers calculated from the rates paid to workpeople for whom employment has been found by the Labour Exchange. In a number of these cases the results appear to be based on too few rates to be taken as representative of wage conditions in the occupation and district.

For the mining industry statistics of average actual earnings are also given. The figures include various bonuses, but no allowance is made for amounts paid as fines, for contributions to insurance funds, nor for the value of free coal. The average daily earnings are calculated by dividing the total wages in a given period by the number of worker-days.

In addition to these statistics the Ministry of Industry and Labour publishes each month in the *Revue du Travail* a section dealing with the

labour market in which are given wage data for different categories of workers in various industries and districts. The analyses of the principal labour disputes and the terms of settlement in many cases include information as to the rates of wages fixed. Also in decisions reached by various national Joint Committees the rates of wages agreed upon are sometimes given in the *Revue du Travail.*

As indicated, the statistics are given in detail, by occupation, industry and district, and are not combined into general averages.

BULGARIA

The Direction générale de la Statistique of the Kingdom of Bulgaria publishes each month in its *Monthly Statistical Bulletin* a table in which are given the wage rates of ordinary labourers, of labourers with two and with four oxen, and of masons. The data are given for 12 chief towns, while the 1914 wage rates are given for comparison.

In certain numbers of the *Bulletin* the wages of other groups of workers are tabulated. Thus in the number for January-February 1923 information was given as to the wages of State workers engaged on building and road-making. Among the occupations included were masons, carpenters, stone-cutters, carters with two horses or oxen, and ordinary labourers (men and women). The statistics were given by departments and an average for the whole country calculated.

CANADA

The Department of Labour publishes each month in the *Labour Gazette* summaries of various industrial agreements and schedules of wages for various groups of workers in different industries and districts. Data as to hours and other conditions of labour are also included. While some of these contracts cover a wide area, others apply to small groups of workers in particular localities, or even to the workers employed in one establishment only. Recent changes in wages and hours of labour are also reviewed from time to time in the *Labour Gazette.*

The Labour Departments of various provincial governments publish, generally in annual reports, statistics of wages and hours, while the annual reports of minimum wage boards in the different provinces give the rates of wages and hours of labour as fixed in the industries and occupations covered. In some cases data of actual earnings and hours are collected for comparison with the minimum rates fixed.

In addition, the Dominion Bureau of Statistics collects and publishes, for various industries, statistics based on reports from a number of establishments showing the amount of capital invested, the number of salaried employees and wage earners, the salaries and wages paid, the cost of materials and the value of the products. The data of earnings are tabulated to show separately for male and female workers under and over 16 years of age respectively the numbers in each wage group (*e.g.* under $5 per week, $5 but under $10 per week, etc.).

The most comprehensive compilations of wages and hours of labour

in Canada are those prepared by the Department of Labour and published as special reports. The first of these, which was published as a supplement to the *Labour Gazette*, March 1921, gave detailed data of wage rates from 1901 to 1920 of a selected number of building, metal, and printing trade workers and for the most important class of electric railway employees in thirteen cities of the Dominion. It also contained tables of wages of typical classes of steam railway workers, while a number of samples of rates of wages for common labour in factories, for miscellaneous factory trades, and for employees in the lumbering industry were given to illustrate the trend of wages in these classes of occupations during the period 1911 to 1920. These samples give an indication as to changes in wage rates in rural districts or of unorganised workers, while the data for the various trades are representative of the wages of skilled workers in the cities. Later reports have continued the compilation, giving figures for June and September 1921 and for various months in 1922. Statistics have been added for various other trades and industries, including coalmining. The figures given are generally hourly rates of wages, together with the number of hours per week.

The data are obtained by Departmental officers and correspondents, and from copies of signed agreements and returns from trade union officials and employees.

In addition to publishing the money wage rates in detail, the general trend of the wage movement is shown by means of index numbers based on the rates paid in the thirteen selected cities. For each series of rates, that is for each trade or occupation in each locality, index numbers are calculated on the base 1913 (= 100) and these index numbers are averaged by groups for all localities. The groups are: building, metal, printing, electric railways, steam railways, and coal mining. The index numbers for these groups are then combined into a general average. Index numbers are also given for common labour in factories, for miscellaneous factory trades and for lumbering, based on the sample rates of wages collected. In all cases the averages calculated are simple arithmetic means. The average percentage changes in rates for 27 cities have been calculated by groups, compared with the results for corresponding groups based on data for 13 cities, and were found to be approximately the same.

DENMARK

The Department of Statistics publishes in the *Statistiske Efterretninger* statistics of average hourly earnings for each quarter in a number of occupations. A summary of results is also published in the Statistical Yearbook *(Statistisk Aarbog)*. The figures are based on data supplied by the Danish Association of Employers *(Dansk Arbejdsgiver-og Mesterforening)*. Forms are filled in by each member of the Association on which are given actual earnings whether from time or piece rates, together with the number of working hours of each individual worker employed by the member. The data for each category of worker from the different establishments are added together and average hourly earnings calculated by dividing total earnings by the number of hours actually worked.

The statistics are published in two tables, one of which shows the average hourly earnings in various trades or other groups within different industries (1). The second table gives general average hourly earnings for all trades and industries combined, separate figures being given for skilled and unskilled male workers and for female workers as well as an average for all workers. In both tables figures are given separately for Copenhagen and the Provinces, while in the summary table averages for the whole country are also given. Figures are available for 1914 and 1917, while from the middle of 1918 figures for each quarter have generally been published. The number of industries and trades included has been increased and it is considered that from the second quarter of 1920 the statistics may be taken as being representative of wage conditions in Danish industry. In calculating the general changes in the level of wages, the variations from quarter to quarter in the number of workers within the various industries are not taken into consideration, but such variations have been small, and the differences in results by not allowing for this factor are believed to be of comparatively little importance. No indication is given as to the number of hours per week, either actual or full time, in the different occupations.

In addition to the above data figures have been published in *Statistiske Efterretninger* from time to time of wages in special industries or of special groups of workers such as agricultural workers, sugar and chocolate makers, cigar makers, hat and glove makers, gold beaters, electricians and smiths, and machine workers. The figures have been obtained either from the employers or from the trade unions. Data have been published of the salaries of State employees, while comparisons have been made between earnings in certain industries of workers on time work and of those on piece work, the figures being supplied by the employers' associations.

SPAIN

Information on the movement of wages in the principal industries and districts is published each year in the *Bulletin de l'Institut des Réformes sociales*. The statistics are collected from the workers' organisations and the establishments by representatives and correspondents of the Institute and by the intermediary of the local authorities.

In addition to these data which are published regularly, statistics are collected for special purposes. Thus in 1922 an enquiry was made into the wages of agricultural workers, for the purpose of determining the importance of payments in kind. In 1923 statistics of the rates of wages in a number of occupations in the building, metal, printing, and food industries in Madrid were collected, and comparisons made with

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(1) The industries included are: food, tobacco, textiles, clothing, building, wood and furniture, clay stone and glass, metal, chemical, printing and paper making, commerce and transport, and miscellaneous. Withing these industries data are given by occupation, while in some cases they are given for groups of skilled and unskilled male workers and for female workers.

the rates in 1914. The figures in this enquiry were supplied by the workers' organisations. The establishment of the 8-hour day was preceded by an extensive enquiry as to the normal hours worked in different occupations and districts.

UNITED STATES [1]

The most important statistics of wages and hours of labour in the United States are those collected and compiled by the Bureau of Labour Statistics and published in the form of separate bulletins. Summaries of the data published in these bulletins are generally given in the *Monthly Labour Review*.

The information is divided into two classes:

(*a*) Union scales of wages and hours of labour for which the data are obtained from union officials;

(*b*) Earnings and working hours for which data are obtained from the pay-roll records of employers, and without regard to whether employees are union members or not.

Union scales are taken for trades that are so widely organised that a union scale may be accepted as the prevailing rate of the trade and that are paid at time rates.

Pay-roll data are resorted to in order to get earnings and hours worked for piece-work employees and for trades that are not generally organised.

Union Scales

Data are collected by the Bureau each year as of 15 May for practically all of the general trades employed at time rates in representative cities of the United States [2], special agents of the Bureau making personal calls on secretaries, business agents or other officials of local unions. The data obtained are entered on schedules, while such documentary matter as is available, for example, agreements or union rules is collected to support the statements on the schedule. All statements are checked carefully to avoid errors. In a few instances union wage data have been collected from Union officials by correspondence.

In addition to the detailed figures, index numbers are also computed, showing the trend of hourly rates, weekly rates, and weekly hours. In computing the index numbers for a trade, the first step is to obtain the average rate for the trade, which is done by multiplying the rate per hour in each city by the number of union members in the city, adding the

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[1] See *Bulletin of the United States Bureau of Labour Statistics*, No. 326. "Methods of procuring and computing statistical information of the Bureau of Labour Statistics".

[2] See *Bulletin*, No. 286, for illustration. Amongst the trades included are the following: the bakery, building, metal, printing, and granite and stone trades, and also chauffeurs, teamsmen, drivers, freight handlers, laundry workers, railway motor men, and conductors.

products and dividing by the aggregate number of union members in the country entering into the total. These averages are brought into comparison with the average for the base year to determine the index number for each year. Grand average hourly rates, full-time weekly rates, and weekly hours for all trades combined are obtained in the same manner as the corresponding figures are obtained for each of the several trades.

Pay-Roll Data

All wage figures not obtained from labour organisations and published as union wage scales are compiled from data taken from the pay-roll records of employers. Studies are made and bulletins issued industry by industry (1). Several studies of wages have been made in many of the principal industries.

The Bureau, because of limited funds, cannot undertake a wage census for any large industry. To ascertain wage conditions, therefore, it is necessary to resort to the sampling method. Further it is not practicable to cover a year's records in any number of plants, and the sampling proeess has to be continued to the extent of taking but one sample pay-roll of the year. As closely as possible the pay-rolls for the industry taken from the different establishments are for the same month or the same seasen. The pay-rolls taken vary in length from one week to one month.

Preliminary to the collection of wages data the census figures for the industry are studied to determine in which States the industry is of material importance. Manufacturers' directories are examined and books and periodicals relating to the industry are read.

A tentative list of establishments is selected for each State to be visited. An agent is then sent into a State with instructions as to the number of establishments and number of employees for which he is to get data. The agent is provided with a list of the most important occupations of the industry and is instructed to place the data for each selected occupation on a separate sheet so that the figures therefor may be tabulated separately. In order that the wage survey may cover the establishment as a whole, the occupations not of sufficient importance to be selected for a separate showing are all combined into a group designated as "Other employees".

In many establishments employing piece workers there is no record of the time worked by such employees, as the establishment is interested only in the amount of product and the consequent total earnings of the employee. The major point of interest, however, in the wage study, is to determine what the employee earns when at work, the unit of measure being the average earnings per hour. When any establishment does not have a record of the hours worked, the agent arranges with the establishment to keep a record of the time worked in the pay period selected.

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(1) Among the industries covered are anthracite and bituminous mining and the iron and steel, lumber, millwork and furniture, woollen and worsted, cotton, boot and shoe, clothing, hosiery and underwear, slaughtering and meat packing, petroleum, and the tinplate industries.

After the schedules have been examined and approved, tables are prepared showing, by occupations and States, the number of establishments and employees covered, average earnings per hour and per week, average actual and full-time hours, classified earnings and hours, index numbers of earnings and hours, and other items of interest (1). Comparisons are made with data collected in previous enquiries. Generally figures have been obtained recently every two years.

In addition to the above compilations of wage statistics the Bureau of Labour Statistics receives and tabulates each month reports from representative establishments in a number of manufacturing industries concerning the volume of employment and the amount of the pay-roll. The data are obtained for one pay-roll period in each month. The number of establishments varies somewhat from month to month, but comparisons are made of numbers and amounts in identical establishments for the latest month with those of the previous month and with those of the corresponding month of the previous year. These figures may be used to calculate the average earnings per worker in the period given. Comparison may also be made by taking figures for a series of months or years, but in doing so it should be noted that the establishments would not in general be identical over an extended period.

Several other departments of the Federal government publish statistics of wages each year. Thus the Bureau of Crop Estimates of the Department of Agriculture compiles information as to the wages of labour on farms; the Reclamation Service publishes data of the wages paid to workers on reclamation projects; while the Bureau of Navigation of the Department of Commerce publishes statistics of the wages of seamen on the merchant marine (2).

Various Departments of the governments of different States, for example New York, Massachusetts and Ohio, also publish wage statistics. Thus the New York State Industrial Commissioner receives regularly monthly reports both as regards employment and earnings from 1,648 firms employing in normal times about 600,000 workers. The figures are tabulated and published monthly in the *Industrial Bulletin*. The firms reporting are described as representative New York State factories. The figures published, which are pay-roll statistics, are average weekly earnings, obtained for a given week in each month, namely, that including the 15th, and cover all employees in both office and shop, including skilled and unskilled, male and female, adult and juvenile. No information is given as to the relative earnings of these different groups. It is stated that although as a rule office salaries are higher than the average weekly earnings of shop employees, the office employees form such a small percentage of the total number of workers that their effect in the comparison of the average earnings is negligible. Separate figures are given for the State of New York as a whole, for the city

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(1) Bulletins Nos. 288 and 299 are examples of final results of this work.
(2) See United States Bureau of Efficiency: *Report on the Statistical Work of the United States Government.* Washington, 1922.

of New York, and for the State outside the city. Averages are given for the main industrial groups (1) and also for the most important branches within each group. A general average is given of the weekly earnings in all the industries together. Figures are available for each month from June 1914.

FINLAND

No special wage statistics are published for Finland, but certain regular series of statistics include information with regard to wages. The chief of these are described in outline below:

(1) Wage data are included in the section on industrial statistics published annually as part of the official statistics of Finland. The figures are collected from the employers, who are obliged by law to give an annual statement respecting various aspects of their undertakings. All important industries are covered by these statistics. The wage figures given are average earnings calculated by dividing the total wages paid by the employers in each industrial group during the year by the corresponding number of "full-time workers", *i.e.* those who worked 300 days in the year.

(2) The agricultural statistics, which also form part of the official statistics of Finland include figures of the average daily wages of male and female agricultural workers in the provinces. The data are obtained through the governors of the provinces who get them from local officials. They are of an approximate character only.

(3) Special investigations have been made into a number of industries in connection with the Labour Statistics of Finland. The results include wage data. The figures in these investigations are obtained from the employers and from the workers by means of forms, which are more detailed than those used for collecting the data for the annual industrial statistics. Extracts from the pay-rolls, giving the amount of the wages paid, the number of workers, and the number of days worked, have been supplied by the employers. Average earnings are calculated in a similar way to those described in paragraph 1. The industries covered include the tobacco, textile, baking, printing, paper, needle making, glass, and sawmilling industries, while investigations have been made regarding the conditions of night work of women, of the work of school children outside school, and of clerical workers and shop assistants.

The Department of Social Statistics of the Central Statistical Office of Finland has been ordered by the Government to compile regular statistics of wages.

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(1) Including stone, clay and glass products, metals, machinery and conveyances, wood manufactures, furs, leather and rubber goods, chemicals, oils and paints, paper, printing and paper goods, textiles, clothing, millinery, laundering etc., food, beverages and tobacco, water, light and power.

FRANCE

The *Bulletin du Ministère du Travail* and the *Bulletin de la Statistique générale de la France* are the two chief official sources of statistics of wages in France. In the former of these sources articles of a general character are published from time to time outlining the movement of wages during recent months. These articles are written on a uniform plan, and the movement is followed by examining:

(*a*) the statistics of strikes;
(*b*) changes in wage rates effected (i) after strikes, and (ii) without strikes, whether by agreement arranging for regular changes based on variations in the cost of living, or by agreement not based on such variations; and changes affected by decisions of employers.

The statistics are tabulated to show the number of strikes, (*a*) total; (*b*) successful; (*c*) unsuccessful, or regarding which the results are not known. These figures are grouped separately according as the strikes were declared with the object of enforcing demands for increases in wages, or as protests against reductions in wages. In addition to the number of strikes, the number of workers on strike is also given for each group. In this section no wage data are given but the wage movement is estimated by considering the general success or failure of the strikes.

With regard to the changes in rates of wages, these are given in some cases in the form of percentage increases or decreases, or the amounts of increases or decreases are given in francs for different categories of workers in different industries and districts. In other cases the actual rates before and after the change are given.

Articles giving wage data for certain industries, *e. g.* mining, or giving the results of enquiries into the wages of other special groups of workers are published in the *Bulletin du Ministère du Travail*, while analyses are given of various collective agreements, the texts of which have been communicated to the Ministry.

In the *Bulletin de la Statistique générale de la France* are published the results of the enquiry conducted every five years to obtain information as to the ordinary wages of various categories of workers. The data are obtained by means of a questionnaire sent to the *Conseils de Prud'hommes* and to the mayors of the chief towns of the departments where no *Conseil de Prud'hommes* is established. The occupations given in the questionnaire are those in the "small" industries and, being found in almost all areas covered by the enquiry, a uniform basis for comparison is obtained. It is believed, however, that considerable variation exists in the methods adopted by the local authorities in estimating the wages in their areas. The data resulting from the later enquiries have the advantage of being collected under similar conditions to those in the preceding investigations, and in consequence can be accepted as a reasonable basis for forming approximate conclusions as to the general wage movement.

The data are given by occupations and separate averages are calculated

for Paris and other towns. The figures include average hourly and daily wages. In addition averages (apparently unweighted arithmetic averages) have been calculated for 38 male and for 7 female occupations. In order to show the variations of wages from one district to another a separate table is given showing for the chief town of each Department the average of the wages in 38 male occupations.

The information based on the enquiry made every five years is supplemented by special articles giving recent data, generally of rates of wages in various industries. Thus for the metal industry, rates as fixed during the war-period by the *Ministère de l'Armement*, and since the armistice by agreement between employers' and workers' organisations or by decisions of the employers' federations, are given for various groups of workers. Figures are also given for agricultural workers in a number of Departments, for textile and clothing workers and for coalmine workers. Statistics of earnings of workers in coalmines are also published in the *Statistique de l'industrie minérale.*

INDIA

The Indian Department of Statistics commenced in 1878 the publication of a series of volumes dealing with *Prices and Wages in India*, the thirty-seventh of which, dated 1923, includes statistics up to 1921 and the beginning of 1922.

Tables are given showing wage data as described below.

(1) Average monthly wages (in rupees) of skilled and unskilled workers in Baluchistan and certain specified Indian States (1) are given for the second half of 1873, and of the years 1908 onwards. Data are given for able-bodied agricultural labourers, horse-keepers and common masons, carpenters and blacksmiths in the principal centres in each area, and arithmetical averages calculated. These statistics are compiled from half-yearly returns furnished by political officers. Owing to the somewhat problematical accuracy of these returns they have been discontinued in all the British provinces in India except British Baluchistan. In their place a quinquennial wage census has been adopted except in the Central Provinces, where an annual return is still in vogue. The first quinquennial wage census was taken in 1911-1912.

(2) Daily wages in the Central Provinces and Berar from 1909-1910 onwards are given separately for twenty-eight different towns, the workers covered being common labourers, workers in iron and hardware; brass, copper and bell-metal workers; carpenters, masons and builders; and cotton weavers (hand industry). Data are also given for agricultural labourers, carpenters, and other labourers in twenty-two rural districts.

(3) The rates of wages obtained in the quinquennial wage censuses are given separately for urban and rural areas, for important towns or districts in the various provinces. In general, daily rates of wages are given for a number of categories of skilled and unskilled workers.

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(1) Rajputana, Central India, Hyderabad and Mysore.

(4) The wages paid in certain State and railway establishments including the pay of postal runners and postmen, of skilled and unskilled workers in various railway centres, and of canal workers are given. The information is obtained from returns furnished by the Post Office, State railways and workshops, etc.

(5) With regard to wages paid in industrial undertakings, figures supplied by the business establishments, collieries, mills, and other companies are published to give some indication of wage conditions in the selected industries. In many cases the data cover the period from 1896 onwards. Wages in sample cotton, woollen, jute paper and rice mills, in boot factories, breweries, tea plantations, engineering works, and coal and shipping companies are given.

The question of the improvement of wage statistics, especially industrial wages, is still under the consideration of the Government of India.

The *Labour Office of the Presidency of Bombay* has recently commenced the collection and publication of statistics of earnings and hours of labour in various industries. Early in 1923 a report was published giving the results of an enquiry into the Wages and Hours of Labour in the Cotton Mill Industry. It is stated that this report is the first of a series in which the results of enquiries into the earnings and hours of labour in all trades of the Bombay Presidency will be examined. The information given in the report already published was obtained voluntarily by means of forms which were filled in by the employers, it being understood that the returns were regarded as strictly confidential. The first part of the form dealt with the total numbers working full time, and the net amount of wages paid to those working full time, in May 1914 and May 1921. Separate figures were obtained for men, women, big lads and children. Distinction was drawn between mill operatives proper and those employed in running and keeping in repair the engines and machines, and other miscellaneous persons not actually engaged in preparing, spinning, weaving, and finishing processes. For the mill workers proper the earnings of time and of piece workers were asked for separately. In the second part of the form, the earnings in May 1921 exclusive of overtime pay of each class of time and piece workers were asked for. In the third part of the form information was requested as to hours of labour and overtime rates of pay. The essential facts were obtained from the wages books, and the returns covered over 194,000 workpeople, or more than 80 per cent. of the total employed. In the tabulation and computation of the results weighted averages and the median and quartiles are given, while the percentage numbers falling within certain wage groups (*e.g.* under 12 annas, 12 annas, and under 18 annas) are shown. Data for separate occupations are given for May 1921. Comparison of changes in wages and in the cost of living between 1914 and 1921 is made, and relative real wages calculated.

ITALY

The Ministry of Labour and of Social Insurance published wage statistics in its monthly *Bollettino del Lavoro*. With the recent reorgani-

sation (1923) the functions of the Ministry of Labour are being taken over by other Departments. The figures given in the *Bollettino del Lavoro* were generally wage rates as fixed by collective agreement, and data were published for various categories of workers in different industries and districts. In a number of cases comparison was made between the rates previously in force and the rates fixed by the new contracts, and it was thus possible to use the data for the purpose of estimating the general trend of wages. In a few cases comparisons were made with pre-war rates of wages.

Similar data have been published in the *Annuario statistico italiano*, particularly for workers in the mining and metallurgical industries in different districts. No recent compilation of this statistical year book has, however, been made, the latest being that for 1917-1918.

The general movement of wages in Italy is best followed by means of the statistics of average wages based on the data compiled by the *Cassa Nazionale Infortuni*, and published in the *Rassegna della Previdenza sociale* (1). The statistics begin with the year 1899, the first year after the law providing for the compulsory insurance of workmen against accidents came into operation. The number of workers insured against accident by the Fund rose steadily from 178,439 in 1899 to 988,831 in 1921. The wage data, however, generally cover only about 10 to 15 per cent. of these totals (2), as in the case of the figures for the period from 1913 onwards the average daily wages of workers injured by accidents are used (3), these figures serving as bases in fixing the amount of the indemnity. Evidently average wages based on information collected in respect of victims of accidents only are open to the objections that the number of cases considered is very much smaller than the total number of workers insured, that the figures serve to indicate wage conditions in those occupations in which accidents are the most frequent, and do not make adequate allowance for those workers whose exposure to accidents is relatively small, and that the industries covered may not be representative of industry as a whole. Thus important industries such as mining, metallurgy and shipping, where relatively high wages are paid, and agriculture and textiles where wages are low, together with occupations for which accident insurance is arranged by the unions or by private insurance companies, are not included in the statistics of the *Cassa Nazionale Infortuni*. A further difficulty lies in the fact that during and since the war employers have not always added the amount of cost of living bonuses when communicating the wages of the workers who had been victims of accidents, and consequently the wages ascertained from the data of the fund may be considerably lower for certain years than actual wages

In order to show the variations in wages in different parts of the coun-

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(1) See the numbers for November 1921 and April 1923.

(2) In 1921 the number of victims of accidents among workers covered by the Fund was 98,521.

(3) From 1900 to 1910 employers made returns in general every three months of the total amounts paid in wages to workers to be insured against accident, and these figures were used in calculating average wages for that period.

try, average daily wages of victims of accidents are given separately by insurance districts. A general average is also given for the country as a whole (1).

The statistical offices of certain municipalities publish information as to the rates of wages of various groups of workers in their districts.

NORWAY

The Norwegian Central Statistical Office publishes three main series of wage statistics. Thus the general industrial statistics include certain wage data collected from the employers. A second series gives data collected at intervals of five years, generally from the magistrates in various localities, and averages for all the towns combined are calculated by using of weights proportionate to the populations of the towns. The third series is compiled annually, published in a volume called *Lonninger*, and covers the period from 1914 onwards. The data, which are generally rates of wages, are collected from the district sick funds in the case of five of the largest towns and from labour exchanges as well as from sick funds in the case of the smaller towns and villages. The data for forestry, shipping, roadmaking, and municipal undertakings are secured from official sources. The statistics as to the salaries of village teachers is obtained from the year book of a teachers' association. Those regarding salaried staff in private undertakings are based on returns from 200 important firms including banks, insurance offices, and business concerns. In certain occupations, the statistics are very complete, but for many groups the material is meagre, especially with regard to factory workers.

Separate tables are given of:

(1) The annual salaries or wages of State officials and workers;
(2) Average hourly and weekly wage rates in various occupations in different towns, and averages calculated for all towns combined;
(3) Wage rates in various occupations in five important towns and in certain rural communes, figures being given for a larger number of categories of workers than in the table described above.

Tables are also given showing the wage rates of forestry workers in various occupations and districts, together with averages in all districts combined; of the wage rates of different categories of sailors in important shipping centres; of the wage rates of workers engaged on road making in various districts, and averages based on these data; of the wage rates of municipal workers in various towns, by occupation; of salaries of teachers in elementary schools, of bank clerks, and of the staffs of private undertakings.

The statistics are of time rates of wages, per hour, day, week, or other

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(1) These wage data, together with figures supplied the employers' or workers' organisations in different industries, were presented to the special Committee of Enquiry on the Conditions of Industry, which was appointed in 1922 by the Ministry of Labour.

period, while the wages of piece workers are not taken into consideration. Data of annual wages and salaries are calculated on the basis of a 9-hour day to 1919, and of 8 hours from 1920 onwards, and of a 300-day or 50-week working year.

NEW ZEALAND

In the *Official Yearbook* (1), compiled in the Census and Statistics Office of the Dominion of New Zealand, statistics are given for each year from 1909 onwards of the weekly wage rates in various principal occupations. The figures are unweighted arithmetic averages of the rates of wages in four chief industrial districts as fixed by awards of the Arbitration Court. In the case of hotel workers, agricultural and pastoral workers, and shipping and cargo workers, the estimated value of food and lodging is added to the award rates.

In addition to the average rates given in detail, index numbers have been calculated showing relative changes in rates of wages from 1909 onwards (*a*) by industrial groups (2) and for all groups combined, and (*b*) in the four chief industrial districts. The figures refer to 31 March of each year. The data on which these index numbers are based are collected almost entirely from the awards of the Arbitration Court. It is recognised that the rates specified in such awards are minimum rates, and that wages may in some cases be above the prescribed minima. It is stated, however, that for the purpose of tracing the movement in wage rates over any considerable space of time, the award rates form a more reliable basis than any information which could be collected directly from employers or trade union secretaries as to the ruling or predominant rates in any industry. In the case of agricultural and pastoral and railway workers, no awards exist, and information as to the ruling rates of wages in these groups is obtained from the Labour Department and the Railway Department respectively.

In weighting the rates in each district, the occupations included are grouped into the 14 industrial classes given above (3), and the number of workers in each industrial group in each district as recorded on the trade union rolls for December 1916 has been taken as representative generally of the total number of workers engaged in each industry. In the case of agricultural and pastoral works these data are not satisfactory, and the 1916 census figures for wage earners are used as basis in deriving the weights by interpolation.

The base taken for the index numbers is the Dominion weighted average wage for all groups combined for the average of the years 1909 to 1913.

Index numbers of effective (real) wages are also calculated, using

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(1) See *Official Year Book*, 1923.

(2) Food, drink, and tobacco; clothing, boots, etc.; textiles and weaving; building; wood manufacture; printing, etc.; metal working and engineering; other manufactures; mining; agricultural and pastoral; land transport; shipping and cargo working; domestic service; and miscellaneous.

(3) See footnote 2.

index numbers of food prices only as representative of changes in the cost of living, index numbers based on "all groups" not being available prior to 1914.

Information is also given as to weekly hours of labour by occupation from 1909 onwards, and index numbers calculated on similar lines to those of wage rates described above are included.

NETHERLANDS

Wage data for various occupations, industries, and districts in the Netherlands are published by the Central Statistical Office in its *Maandschrift*. An analysis is given of important collective agreements, the texts of which have been communicated to the Bureau. Information is given as to the group of workers, the district, duration of the agreement, the parties to the agreement, the wage rates fixed, and the hours of work. An indication is generally given as to the date of the previous agreement, and the number of the *Maandschrift* in which its terms were given; it is thus possible to use these data to determine the movement of wages over a period.

Statistics are also given of the minimum wage rates of workers on State contracts, of the wage rates of municipal gas and electricity workers, and of other groups of workers in State, communal or private undertakings, including dairy workers, munition workers, printing trade workers. Statistics of earnings of various groups of workers are also published including those of coalminers, metal workers, and of building trade workers (Amsterdam). The information is generally given by occupation and district, while in certain cases data are given of hours of labour.

Statistics of wages and hours of labour are published by the Central Statistical Office in *Bijdragen tot de Statistiek van Nederland*. The figures included are in many cases those which have been published in the *Maandschrift*, but additional data are given and summaries and comparisons made.

POLAND

The Central Statistical Office of the Republic of Poland publishes statistics of wages in its monthly review, *Statistique du Travail*. The figures given are rates of wages, the groups of workers covered including cement workers, metal workers, textile workers, skin and leather workers, bakers, brewery workers, shoemakers, building workers, printers, gas workers, together with bank officials, the staffs of textile works, State servants, and teachers. The information is generally given in detail by occupation or grade. In most cases the data are for Warsaw, or figures are given separately for Warsaw and several other important towns. Generally the information is obtained from employers' organisations. In certain cases averages are given,

but no indication is given as to how they have been calculated. The statistics are generally in continuous monthly series from January 1921 onwards, and index numbers are given showing the movement in each industrial group.

Comparison is also made with pre-war rates. A difficulty arises on account of the fact that post-war rates are given in Polish marks, whereas the pre-war currency varied according to the district, being sometimes roubles, sometimes German marks, and sometimes Austrian crowns. Conversion of pre-war roubles and pre-war crowns into pre-war marks has been made at the rates of 1 rouble = 2.16 German marks, and 1 crown = 0.85 German marks. The post-war wages in Polish marks are then compared with pre-war German marks.

Real wages and salaries have been calculated for certain groups by reducing the money wages or salaries of the post-war periods to marks of pre-war value by dividing those sums by the cost of living index numbers for Warsaw for corresponding dates. Comparisons are then made with the pre-war wages or salaries.

The statistics described above are summarised in the *Annuaire de la Pologne.*

UNITED KINGDOM

The most important statistics of wages and hours of labour are those published in the *Ministry of Labour Gazette* each month. Two kinds of data are given: (1) all reported changes in wage rates, tabulated to show for the categories of workers affected in given industries and districts the amounts of the changes in rates of wages, and generally the rates before and after the change (1); (2) earnings in certain industries, published in connection with the unemployment statistics.

The wage rates given are "Standard" rates, this term being used to include not only those rates definitely recognised both by employers and workpeople, but also, in the absence of mutual agreement, the rates recognised either by employers or their associations or by the trade unions concerned. In some cases rates may be paid which are higher than those quoted; in others, for example where a considerable proportion of the employers and workpeople are not represented on the employers' associations and trade unions by whom the agreements are signed, a proportion of the workpeople may be receiving lower rates.

A continuous record of changes in wage rates and hours of labour reported from day to day has been kept since 1893, and in addition to the publication of results in the *Labour Gazette*, annual reports were compiled up to 1915. The data are given in great detail by occupation

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(1) Statistics are also compiled showing the approximate numbers of workpeople affected, and the effect of the changes on the weekly wage bill.

district, and industry (1), and it is generally possible from the information published in the *Labour Gazette*, to follow the movement of wages in a given occupation and district over a period of years. Further information about these statistics is given in the text of this Report.

At various dates, articles based on the wage rate data collected have been published in the *Labour Gazette*, comparison being made of the rates in different industries at various dates with those in August 1914. For certain occupations unweighted averages are calculated of the recognised time rates of wages in large towns or other important centres, while for other groups — particularly those on piece work — indications are given as to the percentage changes during the period. Estimates are also given as to the average percentage changes since 1914 in the weekly rates of wages of adult workpeople in all industries and occupations covered. It is pointed out, however, that the figures relate mainly to general or district changes arranged as the result of action by organised bodies of employers and workpeople, and that the unorganised industries are not adequately represented in the available statistics. In many cases where no rates of wages are generally accepted as standard or recognised rates in a particular occupation, predominant rates are obtained where possible by enquiries from employers.

Statistics of earnings published monthly in connection with the unemployment reports are based on returns of a number of employers and give for the cotton, woollen, and worsted branches of the textile industry and for the boot and shoe, brick-making and pottery industries (2) not only the number of workpeople employed by the employers making returns but also the total weekly wages paid. Their main purpose is to enable estimates to be formed as to changes in the state of employment during given periods. They may also be used for calculating average weekly earnings per worker in any branch, and comparisons made with those at previous dates or in other branches. In making such comparisons, however, it should be noted that the numbers of workpeople and the total wages paid are those covered by the returns received by the Ministry of Labour, and do not represent the total numbers employed in the various industrial branches. The comparisons of numbers employed and wages paid at different dates would not in general relate to the same firms at each date, while the figures cover all the wage earners, irrespective of age, sex or occupation, employed by these firms.

In comparing the earnings in different industries therefore, it should be remembered that any average calculated from the figures are affected not only by variations in the state of employment and in the rates of wages, but also by differences in the proportions of males and females,

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(1) The statistics are classified into the following industrial groups: building, mining and quarrying, iron and steel smelting and manufacture, engineering and shipbuilding, other metal trades, textile trades, clothing trades, transport trades, agriculture, paper, printing and allied trades, furniture and woodworking trades, chemical, glass, brick and pottery trades, food, drink and tobacco trades, miscellaneous trades, and public utility services.

(2) Until the middle of 1922 a much larger number of industries was covered.

of adults and juveniles, and of skilled and unskilled workers in the respective industries.

Data were formerly given in the *Trade Boards Quarterly Gazette* of the general minimum time rates of wages as fixed by Trade Boards, while for some occupations piece rates and overtime rates were also given. The Orders made under the Trade Boards Acts are given each month in the *Labour Gazette*. The number of workpeople employed in industries covered by Trade Boards is estimated at about three million.

The Mines Department of the Board of Trade has, since 1920, published a statistical summary of output and costs of production, proceeds and profits of the coal mining industry, by districts and for the country as a whole. The particulars relate to undertakings producing in all generally between 90 and 100 per cent. of the total quantity of coal raised during the period covered (usually a quarter). The total amounts paid in wages are published for each district and for Great Britain as a whole as one of the items of cost of production. Earnings per worker per shift are also given.

SWEDEN

Information as to rates of wages fixed by collective agreements is published by the Social Board in special reports and in the *Sociala Meddelanden*, the terms of the agreements being summarised to show for different occupations and districts the rates in force during the period of the various contracts.

Statistics of earnings are also published annually in the *Sociala Meddelanden*, the data being obtained from the employers by means of questionnaires. The representatives of the various associations of employers were given an opportunity of making suggestions as to the plan of enquiry and the form of the questionnaire. There is no legal compulsion to supply the information requested, replies being purely voluntary. After the end of each year forms are sent to all employers belonging to the Swedish Association of Employers, the General Union of Commerce and the Swedish Railway Association, as well as to selected employers in certain other industries, as recommended by the respective employers' associations. Banks, insurance offices, and newspapers are also included. The total number of employers approached is about 5,000, including most of those controlling the large undertakings. The averages for 1921 were calculated from statements covering 3,112 undertakings, with 215,764 workers.

The statistics include:

(*a*) Salaries of foremen, technical staff and clerical workers in industry, commerce, transport, banks, and insurance offices;

(*b*) Wages of workers in manufacturing industries, transport, communication, and commerce.

The statistics of wages are given by industrial groups and sub-groups, but not generally by occupation. Figures are, however, given separately

for adult male workers, for adult female workers and for young persons (under 18 years of age), as well as general averages including all three groups. A further development of these statistics is planned Their main purpose at present is to illustrate the general movement of wages in comparison with changes in the cost of living.

Average annual earnings are given for each group, these being calculated by dividing the total amount actually paid (including overtime pay, payment in kind, etc.) to each group during the year, by the number of workers. The average number of workers is calculated by adding together the number of workers on each pay-day in the year, and dividing by the number of pay-days. In addition to average yearly earnings, average daily earnings are calculated by dividing total yearly wages by the total number of worker-days. Figures are available for various years from 1913 onwards.

Certain groups, for example agriculture, forestry, restaurants, and domestic service are not included among the industries covered by the statistics of earnings described above. For such groups, special enquiries have been made, and the results published in special reports or in *Sociala Meddelanden*. With regard to agriculture the information is obtained from annual reports of the chairmen of local councils, which are at intervals checked by comparison with data obtained from the payrolls of certain employers, while in the other cases the data are collected from various sources, *e.g.* the public labour exchange offices, which are checked by comparison with returns from associations of employers and workers. In certain groups rates of wages are given while in others statistics of earnings are obtained.

For certain periods, statistics are also available concerning salaries or wages of public servants, whether in State employment or in municipal service including, those in administrative offices, police and fire brigades, hospitals, and schools.

Summaries of the data described above, together with information as to hours of labour in certain occupations, are published in the *Swedish Statistical Year Book*. The statistics of hours are computed partly from the collective agreements, and partly from data obtained by special enquiries which, in the case of agriculture, are carried out annually, and in other industries are conducted at longer intervals.

SWITZERLAND

Statistics of wages based on data taken from the records of the Swiss National Fund for insurance against accidents are published in the *Statistical Year Book*. It is stated that the figures are earnings, not rates of wages, and include regular allowances at the time of the accident. Foremen and similar groups are included but not apprentices, managerial staff, technical experts, commercial travellers or office staffs. It is also noted that the statistics for certain categories of workers are based on a comparatively small number of cases. Further, the different categories of workers are not represented proportionally to actual numbers.

Three groups of tables are given. The first shows for all industries combined, data of average earnings per hour and per day of men, women, and of young people under 18 years of age. The median and quartiles are given and the numbers and percentages of workers falling within different wage groups shown. Tables follow which give similar data by industries, and also include information as to the predominant wage in each group. The third series of tables gives statistics by occupation.

CZECHOSLOVAKIA

Wage statistics compiled by the Statistical Office of the Czechoslovak Republic have up to the present been made systematically only for the mining industry. For that industry the methods adopted and the results obtained were published for the year 1919 in the *Reports of the Statistical Office of the Czechoslovak Republic, 1923,* Nos. 33-35 for the year 1920 in Nos. 47-49, and for the year 1921 in Nos. 96-98 of the same publication.

The data were obtained by means of forms sent to each establishment. Separate forms were provided for each category of worker, and each establishment was required to supply the information demanded, for each pay period throughout the year, thus enabling the changes in earnings to be followed. In addition to given information as to the number of days worked and lost, the results show the total gross earnings including all regular allowances, the net earnings, and the average earnings per worker per day.

With regard to wages in agriculture the Statistical Office has compiled data from various secondary sources, particularly the collective agreements. Wage rates, including payment in kind, based on these agreements, have been published for the period 1919-1922 in Report No. 58 (1922) of the Statistical Office.

Wage data for the metal and chemical industries for the period 1914-1919 have been compiled and published in the *Statistical Bulletin* of the Czechoslovak Republic, 1920, the data being obtained from the Chambers of Commerce and Industry, from the employers' and workers' organisations, etc.

APPENDIX II

Wage Censuses

The problems involved in general collections of wage data, whether undertaken at regular but infrequent intervals or only on exceptional occasions, do not usually differ in kind from those met within the collection of wage statistics undertaken as part of the ordinary work of various government departments. They do, however, differ in scope, covering generally a much wider field than that of the data ordinarily collected, and often special machinery of collection is set up and special relations entered into with the employers or others from whom the data are obtained. These differences may justify the inclusion in this Report of outlines of certain important wage censuses. It is difficult, however, to draw a clear line between the censuses treated below and some of the collections of wage data described in Appendix I, in which are outlined the five-yearly enquiries into wages, for example in France and in Norway. Here general enquiries at intervals greater than five years or enquiries of an exceptional character only are described, outlines being given of the special investigation into wages in the United States in 1901 undertaken by the Census Office, of the Enquiry into Earnings and Hours of Labour in Great Britain in 1906, and of the Wage and Salary Census in Germany in February 1920.

UNITED STATES

In connection with the Report on Manufactures of the Twelfth Census of the United States, the Census Office in September 1901 determined to undertake a special investigation into the wages of workers. It was decided that the enquiry should cover a limited number of important industries only, actually 34 industrial branches being included. The investigation did not cover all employees or establishments in the industries selected, but was believed to give sufficiently representative results for the different occupations. Only those establishments were selected which had been in existence at least 12 years and which had complete pay-book data for the years ended 1 June 1890 and 1 June 1900.

One weekly, half-monthly, or monthly pay period in any month during the census year 1900, and a similar period for the census year 1890, was selected to show as far as possible normal conditions. Data were collected separately for male and female workers under and over 16 years of age. The figures were copied by agents of the Census Office from the books of the different establishments.

With regard to the type of data, actual rates of wages were collected, statistics of earnings being used only when the data in regard to rates were defective or required further interpretation. They were used in the case of piece workers in the calculation of "rates" on a time basis. For time workers the rates were given in the schedules by occupation, e. g.

Blacksmith, 3 males, $2.25 per day of 10 hours, 60 hours per week.

For piece workers a separate line was given to each worker, giving actual earnings and information, where available, with regard to the time worked.

In tabulating the results, the units of time adopted are the hour and the week, and wage data for other units are generally reduced to hourly or weekly rates. The distinction was drawn between actual time and normal or full time, and in all cases the rates published are based on normal time. Actual time when reported was used only in the computation of rates from earnings or of earnings from rates. As indicated above, in the case of piece workers, time "rates" were calculated from actual earnings and actual hours. Where information as to actual earnings only was obtained, this is tabulated separately.

The data for the years 1890 and 1900 are tabulated by separate industries, (*a*) by occupation in all establishments, and (*b*) by treating a given establishment in a particular industry as unit, and classifying all workmen within this unit according to the wages received.

In order to ensure comparability in tabulations for an industry by selected occupations, only identical establishments for the two periods 1890 and 1900 are included. The tabulation by occupation enables comparisons to be made of changes in the wages of the given class apart from changes in the industry as a whole. That by given establishments makes it possible to locate changes and to determine the relative proportions of skilled and unskilled labour or the substitution of employees of one sex or age for those of another in a given establishment at the two periods. Especially can this be done if occupations within the establishment are also classified. Such detailed tabulations are given for 296 separate establishments, both to illustrate the method and to supplement the tabulation by occupation.

For each industry a summary table shows for each occupation the number of employees in 1890 and in 1900 with the median and quartiles of the rates of wages per week and per hour, and also of the earnings in a given week where they have been tabulated. In the detailed tables comparisons are made for each industry by occupation, of the numbers of workers within specified wage groups (*a*) hourly, (*b*) weekly. Cumulative percentages are used in all the detailed tables, these percentages representing the proportion of the total number of persons

in a given table receiving a wage as great as or greater than the lowest wage of the given group. Medians and quartiles are also given in the detailed tables. In the tables giving data by establishments, similar information is given. For a few industries comparison is made of the weekly rates and earnings in 1900 of the same employees. The volume concludes with a glossary, the object of which is to give a brief description of the occupations in each industry covered.

GREAT BRITAIN

General Enquiry into Earnings and Hours of Labour, 1906-1907

The general enquiry conducted by the Board of Trade into the earnings and hours of labour of all classes of workpeople in 1906-1907 was the second general enquiry into wages in the United Kingdom. The first enquiry was that of 1886, when the principal object was to obtain rates of wages for a full week. In the 1906 enquiry the actual earnings of each individual, irrespective of the number of hours worked, was ascertained. At the same time provision was made for the classification of those workpeople who worked full time, less than full time or more than full time, so that the full time earnings would afford a basis of comparison with the results of the 1886 enquiry. A subsidiary object of the 1906 enquiry was to afford a basis of measurement of changes in wages during the previous twenty years.

The magnitude of the 1906 enquiry is evident from the fact that about 190,000 schedules were issued to employers. For most of the trades, specimens of the forms it was proposed to issue were submitted to some of the largest employers and associations of employers. The resulting criticism and advice led to schedules being drawn up in such a way as to make the compilation of the return mainly a matter of extraction from the wages books.

The employers were asked to furnish particulars showing

(1) the aggregate wages bill of their workpeople for one week in each month in 1906, with the total number to whom wages were paid in such weeks, together with the total wages bill for the year;
(2) the number and earnings of workpeople, classified by occupations, who worked full time, short time, and overtime respectively in the last week of September 1906.

The information under the first heading was of value as showing to what extent the earnings of the workers were affected by seasonal fluctuations in employement.

In addition to the information regarding earnings, further details were requested including information as to hours of labour, overtime rates of pay, the employment of apprentices, Sunday labour, technical education, and a few other points affecting conditions of labour.

As a guide to the filling in of the forms, a small model return, together with explanatory notes and instructions, was prepared, and a

copy sent with each schedule. Special attention was drawn to the fact that all returns were strictly confidential, and that neither the names of firms furnishing returns nor the locality of individual works would be disclosed in any way. The details furnished would be used solely in the compilation of general statistical results in which the identity of each return would be entirely lost.

The results of the enquiry were published separately by industries. The total number of workers covered was 2,982,696; these were distributed in eleven chief industrial groups, and represented in most cases from one third to one half of the total number of workers employed in the different industries.

A system of presentation of the data was adopted which was generally uniform for the different industries. Two kinds of tables are given: (*a*) summary, and (*b*) detailed.

The summary tables give for each industry:

(1) Numbers paid wages, and weekly and annual wages bill;
(2) Weekly net earnings, classified in shilling groups irrespective of occupation;
(*a*) men, (*b*) lads and boys, (*c*) women, and (*d*) girls.
(3) Number and proportion of men, lads and boys, women and girls returned;
(4) Average weekly net earnings of men, lads and boys, women and girls;
(5) Number and proportion of men, lads and boys, women and girls returned as time workers and piece workers.
(6) Hours of labour (average number constituting a full working week);
(7) Average number of holidays per annum.

The detailed tables give in addition:

(1) District summaries, with earnings in each of the principal occupations. For full-time workers the median and the quartiles are given for each occupation.
(2) Earnings in the principal occupations classified in five-shilling groups.

Distinctions are drawn between earnings of time workers and those of piece workers, and also between earnings of full-time workers, and those of all workers, including those working short time and overtime. Comparisons are made of average full-time weekly wages in 1886 and 1906.

GERMANY

Wage and Salary Census of February 1920

The Ministry of Labour decided to undertake a wage census covering the month of February 1920. It was believed that the principle of obtaining information voluntarily would not lead to satisfactory results, and the giving of information was rendered compulsory, employers

refusing to give the necessary information or giving incorrect replies being liable to be fined.

Information was obtained of wages and salaries paid during the four weeks from 2 to 29 February 1920. Altogether 1,559,954 wage earners and 226,521 salaried employees in 11,697 establishments in fourteen important industrial groups were covered by the enquiry. The choice of the establishments was made on the basis of proposals of employers' and workers' organisations. The establishments were distributed throughout the country, including the occupied areas.

The information was obtained by means of forms. A form was issued to each establishment on which were to be entered the total number of workers employed in the establishment on 28 February 1920. These were to be classified as adult male and female workers (*i.e.* over 18 years of age) and young persons (male and female). Information as to the regular number of hours per week worked in the establishment or in the different departments, and as to the total earnings of all the workers in the establishment during the period 2 to 29 February 1920 was asked for. Questions regarding payment in kind, and collective agreements were included. This form was to be filled in by the employer and signed by a representative of the workers.

In addition to the form for the establishment as a whole, a separate form was provided for each wage earner engaged at the selected establishments on the day of the census (28 February), to be filled in by the employer and signed by the worker. Information regarding sex, age, whether married, number of children, and occupation was asked for, and data were to be given as to the weekly earnings and the hourly earnings based on these, for each week during the period 2 to 29 February 1920, and the amounts of all cost of living bonuses and compulsory insurance premiums, but not of overtime payments, were to be included. Amounts paid for overtime were to be given separately, while actual hours (including overtime hours) were asked for. A distinction was drawn between the wages of workers on time work and of those on piece work.

With regard to salaried employees, forms were provided for each establishment and for each employee. Similar information was asked for to that outlined above for wage earners. On the establishment form, however, the salaried employees were divided into four main groups, namely commercial, technical, managerial, and clerical employees. The total amounts of the salaries of each of these groups during the month of February 1920 were asked for, separate figures to be given for men and women. On the card for the individual employee the monthly salary was asked for.

Average hourly wages were calculated in each typical occupation on the basis of the average hourly wages given in the forms, of those workers who on the day of the census had worked in the establishment a minimum of 14 days (or 90 hours). The figures from the cards were totalled and divided by the number included, to give the averages for the different occupations. Separate averages were calculated for time and for piece workers.

In addition to calculating average hourly wages, the average earnings for the four weeks in February 1920 are calculated. The figures used

were for those who were engaged in the same establishment during the four weeks and who had worked at least 150 hours during the month.

Two groups of tables are given regarding the workers in each industry — detailed and summary tables. The detailed tables give by districts and occupations the number of workers covered, the average hourly wages, and the average earnings during the four weeks in February 1920, separate figures being given for time and piece workers. The summary tables show for each industry the numbers of adult and juvenile workers, by sex, and for typical occupations by districts, and for all districts combined, the average hourly earnings of time workers and of piece workers in February 1920 in comparison, in a number of industries, with those before the war. The pre-war figures generally are based on data compiled by workers' unions in the various industries.

For the four categories of salaried employees, summary tables are given showing by industries and for all industries combined, the percentages of men and women, and for men and women the percentages falling within different age groups, and salary groups. Average monthly salaries are given for different sex and age groups, and comparisons made in certain cases with salaries in the year 1913, the pre-war figures being based on insurance data.

APPENDIX III

Measurement of Changes in the Cost of Living as a Basis in Adjusting Wage Rates, and as a Factor in the Calculation of Changes in Real Wages

Index numbers of the cost of living are compiled to show changes in the purchasing power of money over the items entering into the cost of living. They may be used:

(1) as means of adjusting nominal wages to such changes in order that real wages may be maintained (1);
(2) as factors for enabling changes in real wages to be calculated.

The same method of calculation of cost of living index numbers will be adopted whether the results will be used for the first or the second purpose.

In order to measure general changes in the cost of living it is evidently impossible to take account of changes in the prices of all the commodities which enter into the consumption of the community as a whole, or even into that of a given district or class. Hence recourse must be had to a selected group of commodities. The items selected should correspond with actual consumption, and since this varies, not only with different classes of the community, but which each individual, it becomes necessary either to determine average consumption and to assume the existence of an "average man" or of a "standard family", whether of the whole community or of a particular class or district of the community, or to obtain the total consumption of the country or district as a whole.

As average consumption varies from district to district within a country and according to the class of the community, index numbers of the cost of living to be used in adjusting nominal wages or in calculating changes in real wages should be based on the items and quantities consumed in the district and by the workers to whom the wage changes

(1) The adjustment of nominal wages by means of sliding scales may serve to remove to a great extent changes in real wages due to changes in the purchasing power of money, and to prevent continual disputes arising therefrom. Changes in production and in the demand for or the supply of labour, however, may also involve changes in real wages, necessitating a change in the basic rate of the sliding scale and in the standard of living.

or data apply. In practice a number of countries base their cost of living index numbers on the average consumption of working class families. The question of the value of regional cost of living index numbers is outlined below in the section on the calculation of index numbers. Further, average consumption changes from time to time, and different items and proportions will result from investigations made at different dates, owing to changes in the habits of the community or group considered. Such changes may imply a change in the standard of living, and this change as well as changes in the purchasing power of money may cause changes in the cost of living. In order to obtain index numbers which show changes in prices alone it is necessary that the items on which they are based and the quantities of these items should remain unchanged. It is, however, true that the validity of a series of price index numbers is of doubtful value if the commodities included and their weights do not correspond with actual usage, and a revision may become necessary. This raises the question as to the frequency with which enquiries for the purpose of determining average consumption should be made in order to find out whether the items and weights remain satisfactory or need to be changed. In the latter case the problem of the continuity of the series of index numbers must be considered. This is dealt with at the conclusion of this appendix.

For the adjustment of nominal wages, series of index numbers covering comparatively short periods may be satisfactory and the series can be changed for one based on a different list of items and different quantities to meet changes in consumption. In practice the continuity of the series is not essential, all that is necessary being agreement between the parties to the wage contract as to the basic wage which shall be related to the base of the new series and the amount of change in nominal wages following a given change in the cost of living. If index numbers showing changes in real wages are to be calculated, changes in the standard of living as well as in the prices of various items becomes of great importance, especially as the period covered is often considerable. The necessity for continuity of the series of index numbers to show price changes and the impossibility of introducing changes in the items or quantities consumed without interrupting the series, make it difficult to calculate charges in real wages over a long period. A striking illustration of the problem of the unsuitability of weights when the standard of life has changed during the period covered has arisen in several countries in which index numbers are based on articles and quantities of post-war consumption budgets and comparisons made of the pre-war and post-war prices of these articles and quantities. Such index numbers may give a very false indication as to comparative conditions in pre-war and post-war periods if there is considerable difference between the normal budget in the two periods. Thus in Germany and Austria in various post-war periods a number of commodities of ordinary consumption before the war have been either entirely absent or so dear as to be consumed in much smaller quantities than before the war. Further, the quality of goods nominally the same is often inferior to that before the war.

In practice three methods have been adopted in different countries for determining what items to include and the relative importance of

each item in the budget on which the calculations of price changes are based, namely,

(*a*) the standard budget method;
(*b*) the theoretical budget method;
(*c*) the aggregate expenditure method.

(*a*) *The standard budget method*, taking into consideration the present development of statistics, is the most generally satisfactory for determining the importance of various items in the consumption of a given community. The method consists in making enquiries generally into the amounts actually spent on various commodities by a number of families during a given period long enough to give satisfactory results, and the average consumption of the "standard" family calculated. The standard budget resulting from these enquiries should be distinguished from minimum existence budgets in which attempts are made to include all items. For compiling index numbers of the cost of living, however, to show the movement of prices or changes in the purchasing power of money, it is not necessary to include all items constituting a complete budget.

Often the families are selected amongst the working class, and this practice is satisfactory if wage adjustments or changes in real wages are under consideration. Again, according as the habits of consumption are comparatively uniform or show considerable differences so the number of families from which information should be obtained will be small or large. Further, consumption in towns may be comparatively uniform and yet differ considerably from that in rural districts. Should the average be based on families in the urban districts or in urban and rural districts combined ?

(*b*) *The theoretical budget method* consists in determining the relative importance of the food items by taking into consideration their nutritive values and the minimum quantities necessary satisfactorily to maintain human life. The items are based in part on the results of medical research and may take account of the different requirements of persons of different age, sex, and occupation. The quantities are, however, also determined partly by observation as to the consumption of a certain number of individuals and thus the method is to some extent allied with that of the standard family budget. From the observations made are determined the quantities of albumen, fats, carbohydrates, and calories necessary to maintain the health of adult males and adult females engaged on various kinds of work, of children of various ages, and of old people no longer at work.

Chemical analysis of various kinds of food serves to determine the food items which supply these requirements. As in some periods, seasons or localities, the same nutritive value may be obtained more cheaply by one given group of items and in others by a different group, the commodities included may be varied according to the conditions of the market. From the data obtained the food requirements of a working class family of average size may be determined.

It should be noted that the theoretical budget method is of value only as determining the items and quantities of the different articles of food, and that for the remaining group of commodities which enter into the

cost of living some other method must be used. Even for the food group it is only of value in the absence of information of a more complete character.

(*c*) *The aggregate expenditure method* consists in calculating index numbers by using weights based on the total consumption by the whole community of the various commodities. A fixed list of commodities is drawn up and the quantities consumed are determined by adding the quantities of home production to those imported and deducting the quantities exported. The quantities being determined for a given year, it is assumed that the same quantities are consumed every year. For each year or other period the quantity (units) of each commodity consumed is multiplied by the current price per unit, the result representing the total expenditure of the community on that commodity. The sum is then made of the total expenditure of all the commodities included in the list, this sum representing the aggregate expenditure of the community on these commodities in a given period. This is then expressed as a ratio of the aggregate expenditure in other periods.

It is evident that, provided the statistics of national production, imports, and exports are sufficiently highly developed, this method would give very satisfactory results for the community as a whole, though not necessarily for particular classes or localities. For certain items of expenditure and particularly for house rents the statistical data available in most countries are quite inadequate to allow of the application of this method.

Collection of Price Data

The two general methods of obtaining data are for forms to be filled in by the retail dealers or other appropriate establishments or organisations in the different localities, or for the prices to be obtained by agents of the collecting authority. In the selection of the establishments to supply the price data, those could be chosen which have a large working class custom.

With regard to the frequency of collection and publication of price data, this depends, in the case where the cost of living index numbers will be used for the adjustment of wage rates, partly on the rapidity with which prices change.

Calculation of the Index Numbers

Different prices may have been obtained for a given commodity from different establishments in a given town, and of these the average price may be calculated on the predominant price taken for that town. The result may be expressed as a percentage (price relative) of the price at the base period.

The prices or price relatives of the different items in the composite unit may then be combined in one of the following ways:

(*a*) For each town or district, by using weights based on local consumption or budgets, or by using weights based on national consumption or an average budget for the whole country. The index numbers resulting

could then be combined for the country as a whole by taking into account the population of the different towns and districts included.

(*b*) By calculating the average price or price relative of each commodity for the country as a whole, taking into account the populations of the towns or districts and then combining the results, using weights based on average or total consumption. It may be noted that certain countries publish index numbers for the whole country only. In others local indexes only are calculated, while in still others both local index numbers and averages for the whole country are published. Evidently for the purpose of adjusting wages in different districts to changes in the cost of living, or of calculating changes in real wages in various localities, index numbers of the cost of living appropriate to the locality should be calculated. For more general purposes, the local indexes should be combined into an average for the whole country.

In general cost of living index numbers are calculated on the fixed base system. The base period chosen should be one in which relatively normal conditions prevail. Many countries now publish series calculated on a pre-war base, and the question arises as to the desirability of new series on a post-war basis being compiled. Further, problems arise as to the continuity of series of index numbers in cases where changes are made such as the adoption of new weights, of new items or groups of items, in the areas covered, or in the methods of collection or calculation of the data. Complete comparability can be obtained only by a re-calculation in conformity with the new methods. In practice index numbers based on different methods may be combined into a continuous series, provided that the movement as indicated by each method corresponds closely. Where wide differences are shown according as the one or the other method is adopted, no satisfactory fusion can be effected.

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